JBA consulting

South Oxfordshire and Vale of White Horse Level 1 SFRA - Appendix A

Planning Framework and Flood Risk Management Final Report

September 2024

Prepared for:

South Oxfordshire District Council

Vale of White Horse District Council

South Oxfordshire District Council

Vale of White Horse

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A Planning Policy and Flood Risk Management

A.1 Introduction

This appendix provides a brief overview of the key planning policy and flood risk management documents that have shaped the current planning framework regarding flood risk, under the Flood and Water Management Act (FWMA) 2010. Note, the Flood Risk Regulations (2009) were revoked 31 December 2023 as a result of the Retained EU Law (Reform and Revocation) Act 2023. Preliminary Flood Risk Assessments and Flood Risk Management Plans are now redundant.

Figure 1 illustrates the links between legislation, national policy, statutory documents, flood risk data and assessment of flood risk. The figure shows that whilst the key pieces of legislation and policy are separate, they are closely related, and their implementation should aim to provide a comprehensive and planned approach to asset record keeping and improving flood risk management within communities.

It is intended that the non-statutory Surface Water Management Plans (SWMPs) and SFRAs can provide much of the base data required to support the delivery of the Lead Local Flood Authority's (LLFA) statutory flood risk management tasks under the FWMA as well as supporting local authorities in developing capacity, effective working arrangements and informing their Local Flood Risk Management Strategies (LFRMS) and Local Plans, which in turn help deliver flood risk management infrastructure and sustainable new development at a local level. This SFRA is the key flood risk document to support the Local Plan and helps inform planning decisions in relation to all sources of flooding.

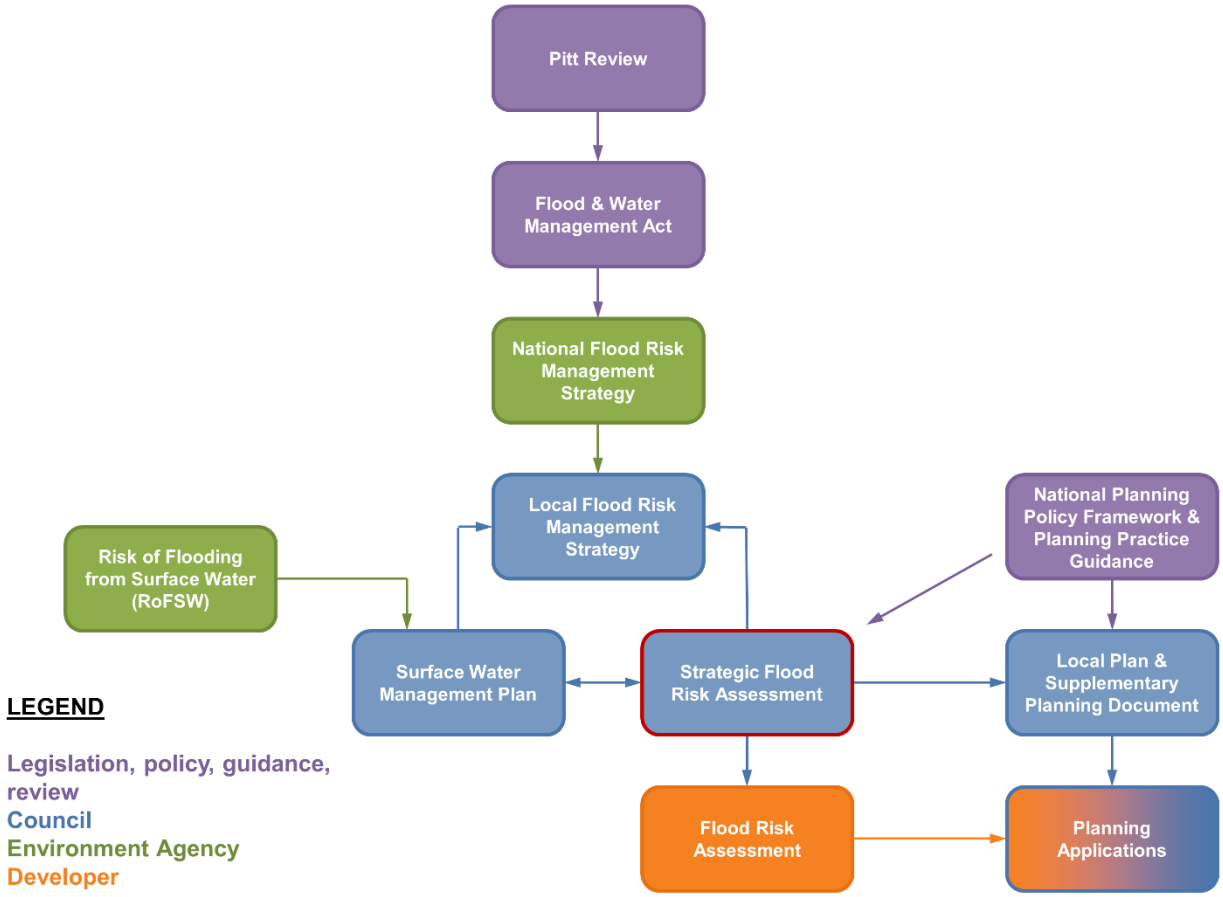


Figure 1: Key documents and strategic planning links with flood risk

A.2 Legislation

A.2.1 Flood and Water Management Act (2010)[1]

The Flood and Water Management Act (FWMA) was established in April 2010. It aims to improve both flood risk management and the way we manage our water resources.

The FWMA has created clearer roles and responsibilities and helped to define a more risk-based approach to dealing with flooding. This included the creation of a lead role for local authorities as LLFAs, designed to manage local flood risk (from surface water, groundwater and ordinary watercourses) and to provide a strategic overview role of all flood risk for the EA.

The content and implications of the FWMA provide considerable opportunities for improved and integrated land use planning and flood risk management by local authorities and other key partners. The integration and synergy of strategies and plans at national, regional and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth.

1 Flood and Water Management Act | GOV.UK | 2010

The FWMA gives Risk Management Authorities (RMAs) specific powers and duties for local flood risk management. A duty is something the RMA is legally obliged to do; a permissive power can be used at the RMA's discretion. All RMAs have a duty under Section 13 of the FWMA to cooperate with one another when exercising functions relating to flood and coastal erosion risk management.

Table 1 provides an overview of the key LLFA duties and powers under the FWMA.

Table 1: Key LLFA duties under the FWMA

FWMA duty / power	Description of duties and powers	LLFA status
Duty to produce a local strategy for flood risk management	The LLFA must develop, maintain, apply, and monitor a local strategy for flood risk management in its area. The local strategy will build on information such as national risk assessments and will use consistent risk-based approaches across different LA areas and catchments. The local strategy should not be secondary to the national strategy; rather it will have distinct objectives to manage local flood risks important to local communities.	The Oxfordshire County Council local strategy is currently being updated. It is expected to be published in 2024.
Duty to comply with the National Strategy	The LLFA has a duty to be consistent with national flood and coastal risk management strategy principles and objectives in respects of its flood risk management functions.	Required
Duty to contribute to sustainable development	The LLFA has a duty to contribute towards the achievement of sustainable development.	Ongoing working with local planning authorities
Investigating flood incidents	The LLFA, on becoming aware of a flood in its area, has (to the extent it considers necessary and appropriate) to investigate and record details of "locally significant" flood events within its area. This duty includes identifying the relevant RMAs and their functions and how they intend to exercise those functions in response to a flood. The responding RMA must publish the results of its investigation and notify any other relevant RMAs.	Ongoing

FWMA duty / power	Description of duties and powers	LLFA status
Asset Register	The LLFA has a duty to maintain a register of structures or features, which it considers having a significant effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection and the Secretary of State will be able to make regulations about the content of the register and records.	Ongoing
Duty to co-operate and Powers to Request Information	The LLFA must co-operate with other relevant authorities in the exercise of their flood and coastal erosion management functions. The LLFA has powers to request information as necessary (e.g., from Thames Water).	Ongoing
Ordinary Watercourse Consents	The LLFA has a duty to deal with enquiries and determine watercourse consents where the altering, removing or replacing of certain flood risk management structures or features that affect flow on ordinary watercourses is required. It also has provisions or powers relating to the enforcement of unconsented works and non-maintenance by riparian owners.	Ongoing
Works Powers	The FWMA provides the LLFA with permissive powers to undertake works to manage flood risk from surface runoff, groundwater and ordinary watercourses, consistent with the LFRMS for the area.	Ongoing
Designation Powers	The FWMA provides the LLFA with powers to designate structures and features that affect flooding or coastal erosion. The powers are intended to overcome the risk of a person damaging or removing a structure or feature that is on private land and which is relied on for flood or coastal erosion risk management. Once a feature is designated, the owner must seek	Ongoing

FWMA duty / power	Description of duties and powers	LLFA status
	consent to alter, remove, or replace it.	
Emergency Planning	OCC is required to play a lead role in emergency planning and recovery after a flood event.	Thames Valley Local Resilience Forum (see Section 6.9.1.1 of the main report)
Community Involvement	The LLFA should engage local communities in local flood risk management issues. This could include the training of community volunteers, the development of local flood action groups and the preparation of community flood plans, and general awareness raising around roles and responsibilities.	Various ongoing. This is not a statutory requirement.
SuDS	SuDS are a planning requirement for major planning applications of 10 or more residential units or equivalent commercial development schemes with sustainable drainage. The LLFA is a statutory planning consultee and it will be between the LPA and the LLFA to determine the acceptability of these proposed sustainable drainage schemes. Approvals must be given before the developer can commence construction, and sometime before the occupation of dwellings. Planning authorities should use planning conditions or obligations to make sure that arrangements are in place for ongoing maintenance of the SuDS over the lifetime of the development. Oxfordshire County Council will become the SuDS Approving Body (SAB) upon the enaction of Schedule 3 of the FWMA (see Section A.2.4).	National Planning Policy and Defra's non-statutory technical standards should be followed. There is currently no timeframe for Schedule 3 of the FWMA.

A.2.2 National and Local Flood Risk Management Strategies

The FWMA establishes how flood risk will be managed within the framework of National Strategies for England and Local Strategies for each LLFA area. The EA has a statutory duty to develop, maintain, apply, and monitor a strategy for England. The EA adopted the National Flood and Coastal Erosion Risk Management (FCERM) Strategy[2] for England on 25 September 2020 and updated it in June 2022, at the time of writing.

The National Strategy sets out principles for how flood risk should be managed and provides strategic information about different types of flood risk and which organisations are responsible for their effective management. The Strategy sets out the long-term delivery objectives the nation should take over the next 10 to 30 years as well as shorter term, practical measures RMAs should take working with partners and communities.

Oxfordshire County Council Local Flood Risk Management Strategy 2021[3]

The FWMA (2010) designated Oxfordshire County Council (OCC) as a Lead Local Flood Authority (LLFA).

Oxfordshire County Council plans to improve the approach to reducing flood risk and thereby increasing the resilience of communities across the country. The strategy is a source of information for all individuals, communities, and businesses prone to flood risk. It is also of relevance to authorities with flood risk management responsibilities, and other partners, to ensure that there is a common understanding of roles, responsibilities, and priorities within Oxfordshire.

OCC have developed the following four high level objectives to manage the various forms of local flooding in Oxfordshire:

1. Improve understanding of flood risks and ensure that all stakeholders understand their roles and responsibilities for flood risk management;

2. Take a collaborative approach to reducing flood risks, using all available resources and funds in an integrated way and in so doing derive enhanced overall benefit;

3. Prevent an increase in flood risk from development where possible, by preventing additional flow entering existing drainage systems and watercourses; and

4. Take a sustainable and holistic approach to flood risk management, seeking to deliver wider environmental and social benefits, climate change mitigation and improvements under the Water Framework Directive.

Note that the updated LFRMS for Oxfordshire is currently out for consultation at the time of writing.

2 National FCERM Strategy for England | Environment Agency | 2022
3 Oxfordshire County Council LFRMS | Oxfordshire County Council | 2021

A.2.3 Thames Regional Flood and Coastal Committee[4]

In its capacity as LLFA, Oxfordshire County Council is a member of the Thames Regional Flood and Coastal Committee (RFCC). The RFCC, established by the EA, brings together relevant members appointed by LLFAs to:

- Ensure there are coherent plans for identifying, communicating, and managing flood and coastal erosion risks across catchments and shorelines;
- Encourage efficient, targeted, and risk-based investment in flood and coastal erosion risk management that represents value for money and benefits local communities; and
- Provide a link between the EA, LLFA, other RMAs, and other relevant bodies to build understanding of flood and coastal erosion risks in its area.

A.2.4 Schedule 3 of the FWMA

Schedule 3 to the FWMA gained Royal Assent in 2020. The schedule, which incorporates recommendations from the 2008 Pitt review, provides a framework for the approval and adoption of drainage systems via a SuDS Approving Body (SAB), and national standards on the design, construction, operation, and maintenance of SuDS. It also makes the right to connect surface water runoff to public sewers conditional upon the drainage system being approved prior to the commencement of construction work.

In England, Schedule 3 has not yet commenced, at the time of writing, due to the changes in planning policy associated with the increased use of SuDS, which was implemented by the Government in April 2015. Current planning policy requires SuDS to be included in all new major developments (more than 10 homes) unless in the case of exceptional circumstances. In these instances, clear evidence is required to support the application. This is in addition to the requirement for SuDS to be given priority in new developments in flood risk areas.

An independent review into the implementation of Schedule 3 was commissioned by the Government and published in January 2023[5]. The review was asked to identify the benefits and impacts of making SuDS mandatory for new development to ensure that its implementation would help in addressing the pressures of climate change, increasing population and urbanisation whilst achieving multiple benefits, such as reducing surface and sewer flood risk, improving water quality, and harvesting rainwater to meet current and future needs.

The review concluded that the delivery of SuDS should not be made entirely through the planning process and recommended that Schedule 3 be implemented subject to final decisions on scope, threshold, and process. This is expected to apply to all developments of more than one property. Government has accepted the recommendations. At the time of

4 Thames Regional Flood and Coastal Committee

5 The review for implementation of Schedule 3 to The Flood and Water Management Act 2010

writing, the consultation is scheduled to be completed in 2023 with the implementation of Schedule 3 expected in due course.

A.2.5 Water Framework Directive

The purpose of the Water Framework Directive (WFD), which was transposed into English Law by the Water Environment Regulations (2003), is to deliver improvements in the management of water quality and water resources through RBMPs, which were first published in 2015 and updated in 2021. South Oxfordshire and Vale of White Horse lie within the Thames River Basin District.

A.2.6 River Basin Management Plans

South Oxfordshire and Vale of White Horse lie within the Thames River Basin Management Plan, managed by the EA. The latest version of the RBMP was published in December 2022[6].

The RBMP consists of a collection of documents which describe how water is managed, together with information about the specific river basin district. The EA is responsible for monitoring and reporting on the objectives of the WFD on behalf of UK Government. They work with central government, Ofwat, local government, non-governmental organisations (NGOs) and a wide range of other stakeholders including local businesses, water companies, industry and farmers to manage water.

The main responsibilities for Oxfordshire County Council are to work with the EA to develop links between river basin management planning and the development of local authority plans, policies and assessments.

The general programme of actions (measures) within the Thames RBMP, which are relevant to South Oxfordshire and Vale of White Horse include working with Risk Management Authorities, wider communities and stakeholders to:

- Work in partnership to develop a catchment-scale approach which will complement local place-based flood risk schemes in non-tidal River Thames catchment (Thames Valley);
- Work in partnership including with Thames Flood Advisors to support all lead local flood authorities to apply for Government funding in Thames River Basin District; and
- Work in partnership with other risk management authorities to support the implementation of the Thames Regional Flood and Coastal Committee 25-year vision in Thames River Basin District

The Thames RBMP also identified two Flood Risk Areas which slightly overlap with the boundaries of South Oxfordshire and Vale of White Horse.

6 Thames River Basin District Management Plan | Environment Agency | 2022

The Oxford Rivers and Sea Flood Risk Area (RS FRA) enters part of South Oxfordshire and part of Vale of White Horse. The EA are responsible for carrying out the four flood risk management measures in this RS FRA:

- Seek and support early engagement with local planning authorities in Oxford
- Support deployment of temporary flood barriers in Oxford
- Work in partnership to finalise the approvals needed and begin construction on a flood alleviation scheme in Oxford
- Work with the Earth Trust to plan future land management practices in Oxford Flood Alleviation Scheme area

The Reading Surface Water Flood Risk Area (SW FRA) also slightly crosses into South Oxfordshire. Reading Borough Council are responsible for carrying out the 11 flood risk management measures in this SW FRA:

- Carry out a flood investigation
- Carry out a strategic flood study
- Consider production of a Supplementary Planning Document on the use of Sustainable Drainage Systems (SuDS) within new developments in Reading
- Consider retrofitting Sustainable Drainage Systems in any highway scheme
- Investigate a Flood Alleviation Scheme in Byworth Close
- Investigate a Flood Alleviation Scheme in North Street
- Investigate a Flood Alleviation Scheme in Princes Street
- Promote understanding of critical flood risk assets through engagement with local communities
- Raise awareness of flood risk by engaging with the community
- Undertake a holistic annual review of progress of flood alleviation schemes, strategies and measures
- Work in partnership with Thames Water Limited and the Environment Agency to progress a Flood Alleviation Scheme

The full list of measures can be accessed via Defra's Flood Plan Explorer[7].

7 Flood Plan Explorer: Thames River Basin District

A.3 Planning Policy

A.3.1 National Planning Policy Framework[8]

The National Planning Policy Framework (NPPF) was published in March 2012 and received a significant revision in July 2018. The latest update took place in December 2023 at the time of writing. The NPPF sets out Government's planning policies for England and describes how these are expected to be applied. The Framework is based on core principles of sustainability and forms the national policy framework in England. It must be considered in the preparation of local plans and is a material consideration in planning decisions. The NPPF is accompanied by several Planning Practice Guidance (PPG) notes.

A.3.2 Flood Risk and Coastal Change Planning Practice Guidance[9]

The Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) was first published in March 2014 and was last updated in August 2022, at the time of writing.

Whilst the NPPF concentrates on high level national policy, the FRCC-PPG is more detailed. The practice guidance advises on how planning can take account of the risks associated with flooding and coastal change in plan making and the development management process. This is in respect of local plans, SFRAs, the sequential and exception tests, permitted development, site-specific flood risk, Neighbourhood Planning, flood resilience and the vulnerability of different developments to help reduce the risk of flooding. The main SFRA report contains more information on the sequential approach to delivering sustainable development and details on the sequential and exception tests.

A.3.3 Local Plans

A Local Plan is a statutory document prepared in consultation with the local community. It is designed to promote and deliver sustainable development. Local Plans must set out a clear vision, be kept up to date and set out a framework for future development of the local area, addressing needs and opportunities in relation to housing, the economy, community facilities and infrastructure, as well as safeguarding the environment and adapting to climate change and securing good design.

Local Plans set the context for guiding decisions and development proposals and along with the NPPF, set out a strategic framework for the long-term use of land and buildings, thus providing a framework for local decision making and the reconciliation of competing development and conservation interests.

The NPPF requires that the evidence base for the Local Plan must clearly set out what is intended over the lifetime of the plan, where and when this will occur and how it will be delivered. The NPPF states that Local Plans should be supported by a SFRA and should

8 National Planning Policy Framework | DLUHC | 2023

9 Flood Risk and Coastal Change PPG | DLUHC and Ministry of Housing, Communities & Local Government | 2022

take account of advice provided by the EA and other flood risk management bodies. South Oxfordshire and Vale of White Horse District Councils are working together on a Joint Local Plan which will inform the determination of planning applications in the districts.

This SFRA should be used to ensure that when allocating land or determining planning applications, development is located in areas at lowest risk of flooding. Policies to manage, mitigate and design appropriately for flood risk should be written into the Joint Local Plan, informed by both this SFRA and the Sustainability Appraisal.

Government guidance on plan making can be found online[10].

South Oxfordshire Local Plan[11]

The South Oxfordshire Local Plan 2035 was adopted by the Full Council in December 2020. It forms part of the **current** development plan for the district and replaces the South Oxfordshire Local Plan 2011 and Core Strategy 2012. The South Oxfordshire Local Plan will be superseded by the Joint Local Plan once adopted.

The plan outlines the future for development in South Oxfordshire up to 2035. The plan identifies locations for housing, retail and employment land, in addition to infrastructure required to support this growth. The policies included within the plan are a starting point for decision making on planning applications within the district.

Vale of White Horse Local Plan[12]

The Vale of White Horse District's Local Plan is divided into two parts: Local Plan 2031 Part 1 was adopted at Full Council in December 2016 and Local Plan 2031 Part 2 was adopted by Full Council in October 2019**:**

- Part 1 outlines the spatial strategy and strategic policies for the district to deliver sustainable development. This section identifies the number of new homes and jobs created in the area and makes provisions for retail, leisure and commercial development and infrastructure to support.
- Part 2 compliments part 1 by outlining the policies and locations for housing for the Vale's proportion of Oxford's housing needs up to 2031.

The Vale of White Horse Local Plan will be superseded by the Joint Local Plan once adopted.

A.3.4 Neighbourhood Plans

The Localism Act 2011, together with the Neighbourhood Planning (General) Regulations 2012, provides rights to allow Parish or Town Councils to deliver additional development through neighbourhood planning. Neighbourhood plans give communities power to shape

10 Guidance on plan-making | DLUHC and Ministry of Housing, Communities & Local Government | 2021
11 South Oxfordshire Local Plan | South Oxfordshire District Council | 2020
12 Vale of White Horse Local Plan | Vale of White Horse District Council | 2019

the development and growth within their local area. Local planning authorities can provide technical advice and support as neighbourhoods draw up their proposals.

A number of Parish and Town Councils across both the South Oxfordshire[13] and Vale of White Horse[14] districts have developed neighbourhood plans.

A.3.5 Sustainability Appraisals

The Sustainability Appraisal (SA) is a key component of the Local Plan evidence base, ensuring that sustainability issues are addressed during the preparation of local plans. The SA is a technical document which must meet the requirements of the Strategic Environmental Assessment Directive 2001/42/EC which assesses and reports on a plan's potential impact on the environment, economy, and society.

The SA carries out an assessment of the draft policies at various stages throughout the preparation of the Local Plan, and does this by testing the potential impacts, and consideration of alternatives are tested against the plan's objectives and policies. This ensures that the potential impacts from the plan on the aim of achieving sustainable development are considered, in terms of the impacts, and that adequate mitigation and monitoring mechanisms are implemented.

A.4 Flood Risk Management Policy and Strategies

A.4.1 Catchment Flood Management Plans (2009)[15]

The Catchment Flood Management Plans (CFMPs) were carried out by the EA in 2009 and were designed to establish flood risk management policies which will deliver sustainable flood risk management for the long term. The CFMPs were used by the EA to help direct resources to where there were areas of greatest risk and helped the EA and its partners to plan and agree the most effective way to manage flood risk in the future. CFMPs contain useful information about how the catchments work, previous flooding and the sensitivity of the river systems to increased rainfall.

CFMPs consider all types of inland flooding, including rivers, groundwater, surface water and tidal flooding.

CFMPs also include:

- The likely impacts of climate change;
- The effects of how we use and manage the land; and
- How areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs.

13 South Oxfordshire Neighbourhood Plans
14 Vale of White Horse Neighbourhood Plans
15 Catchment Flood Management Plans | Environment Agency | 2009

The CFMPs identify flood risk management policies to assist all key decision makers in the catchment. CFMPs are grouped by river basin district and are split down into further Sub-areas. The most appropriate approach to managing flood risk for each of the Sub-areas has been identified and flood risk management policies have been allocated.

South Oxfordshire and Vale of White Horse are covered by the Thames CFMP, as shown in Figure 2. Note that much of the information within the CFMPs will now be superseded by more recent, detailed flood risk information. However, they do still provide some useful information that can be used by the EA, LPA and LLFA.

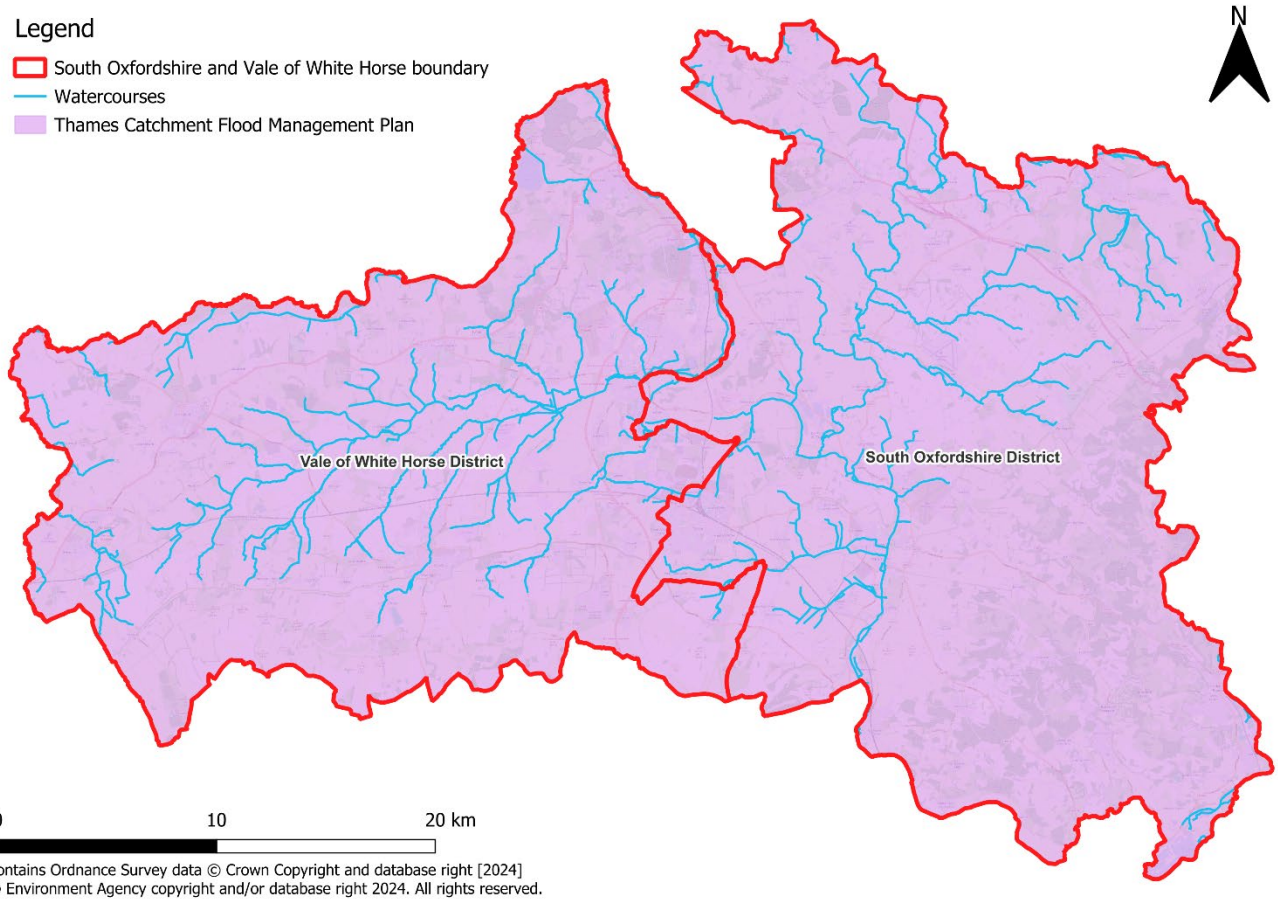


Figure 2: Catchment Flood Management Plan boundary

Thames Catchment Flood Management Plan

Published in 2009, this plan provides an overview of flood risk in the Thames Catchment and sets out a plan for sustainable flood risk management for the next hundred years. The upstream catchment is largely rural, characterised by wide floodplains and rolling hills, whereas the downstream catchment is more urban in character.

South Oxfordshire and Vale of White Horse fall under sub-area's 1, 2, 4 and 8.

Sub-area 1: Towns and villages in open floodplain (north and west)

Preferred policy option 6: Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

This sub-area covers large expanses of open undeveloped floodplains with villages and market towns. Winter flooding of the undeveloped floodplain is a regular occurrence, and this floodplain provides a large area to store water which reduces the risk of flooding to more than 100 communities at risk. The proposed actions to implement the preferred policy option include:

- Maintaining the existing capacity of the river systems in developed areas that reduces the risk of flooding from more frequent events.
- Identifying locations where the storage of water could benefit communities by reducing flood risk and providing environmental benefits (by increasing the frequency of flooding) and encourage flood compatible land uses and management.
- Working with LPAs to retain the remaining floodplain for uses that are compatible with flood risk management and put in place polices that lead to long-term adaptation of urban environments in flood risk areas.

Sub-area 2: Towns and villages in open floodplain (central)

Preferred policy option 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change.

This sub-area contains 12% of the total area of floodplain in the Thames CFMP area. The majority of the flood risk is focussed within towns, however there are around 40 other communities at risk of flooding across these areas. On the Thames especially, flooding can last for a long time as flood water rises and falls over many days. The proposed actions to implement the preferred policy option include:

- Reviewing maintenance to ensure that channel capacity is being maintained in the most efficient way.
- Promoting the use of Planning Policy Statement 25 (PPS25) to create safe and sustainable development that positively reduces flood risk. We will also continue to make sure the recommendations in SFRAs and Local Development Framework policies create the potential to reduce flood risk through regeneration in the longer-term.
- Promoting greater awareness of flood risk amongst organisations and communities, building on current flood warning work. This will focus on actions that can reduce the impact of flooding.

Sub-area 4: Chalk and downland catchments

Preferred policy option 3: Areas of low to moderate flood risk where we are generally managing existing flood risk effectively, is indicative of the approach across most of these areas. This policy recognises the moderate level of flood risk in these areas.

The major source of flooding within this sub-area is from rivers, sometimes in combination with high groundwater levels. Many of the river valleys across the Chilterns are quite steep with narrow floodplains, and many of the more urban river channels have been modified. There are over 50 separate communities where there are over 10 properties at risk of flooding. The proposed actions to implement the preferred policy option include:

- Maintaining the existing capacity of the river systems in developed areas to reduce the risk of flooding from more frequent events.
- Working with LPAs to retain the remaining floodplain for uses that are compatible with flood risk management and put in place polices that lead to long-term adaptation of urban environments in flood risk areas.
- Continuing to increase public awareness, including encouraging people to sign-up for the free Floodline Warnings Direct service.

Sub-area 8: Heavily populated floodplain

Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk. We recognise the challenge of this policy and that we will not be able to reduce the risks everywhere.

These areas contain some of the most populated places within the Thames region. The flood risk is concentrated in known locations and problems with flooding from rivers are well documented. Large scale interventions would be expensive and difficult to build and maintain. The proposed actions to implement the preferred policy option include:

- Encouraging partners to develop policies, strategies and initiatives to increase the resistance and resilience of all new development at risk of flooding.
- Land and property owners needing to adapt to the urban environment to be more flood resilient, including the refurbishment of existing buildings to increase resilience and resistance to flooding.
- Promoting the management of flood consequences.

A.4.2 National Flood Resilience Review (2016)[16]

The National Flood Resilience Review was established by the Department for Environment Food & Rural Affairs (Defra) in September 2016, following Storm Desmond in 2015, to review how flood risk is assessed, how the likelihood of flooding can be reduced and to try and make the country as resilient as possible to flooding. The review aligns closely with Defra's work on integrated catchment-level management of the water cycle in the Government's 25-year Environment Plan.

16 National Flood Resilience Review | DEFRA and Cabinet Office | 2016

A.4.3 25 Year Environmental Plan (2018)[17]

This Plan sets out Government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first. The Plan also sets out how Government will tackle the effects of climate change, considered to perhaps be the most serious long-term risk to the environment given higher land and sea temperatures, rising sea levels, extreme weather patterns and ocean acidification. The Plan aims to show that Government will work with nature to protect communities from flooding, slowing rivers and creating and sustaining more wetlands to reduce flood risk and offer valuable habitats.

Focusing on flood risk, Government has updated the national flood and coastal erosion risk management strategy for England (see Section A.2.2) which looks to strengthen joint delivery across organisations. The Plan states that the EA will use its role in statutory planning consultations to seek to make sure that new developments are flood resilient and do not increase flood risk.

For flood mitigation, Government will focus on using more natural flood management solutions; increasing the uptake of SuDS, especially in new development; and improving the resilience of properties at risk of flooding and the time it takes them to recover should flooding occur.

A.4.4 Surface Water Management Plans

In June 2007, widespread flooding was experienced in the UK. The Government review of the 2007 flooding, chaired by Sir Michael Pitt recommended that…

"…Local Surface Water Management Plans (SWMPs) …coordinated by local authorities, should provide the basis for managing all local flood risk."

The Government's SWMP Technical Guidance document[18], 2011, defines a SWMP as:

- *A framework through which key local partners with responsibility for surface water and drainage in their area, work together to understand the causes of surface water flooding and agree the most cost-effective way of managing surface water flood risk.*
- *A tool to facilitate sustainable surface water management decisions that are evidence based, risk based, future proofed and inclusive of stakeholder views and preferences.*
- *A plan for the management of urban water quality through the removal of surface water from combined systems and the promotion of SuDS.*

17 25 Year Environment Plan | DEFRA | 2018

18 Surface water management plan technical guidance | DEFRA | 2011

As a demonstration of its commitment to SWMPs as a structured way forward in managing local flood risk, Defra announced an initiative to provide funding for the highest flood risk authorities to produce SWMPs.

Defra's framework for carrying out a SWMP is illustrated by the SWMP wheel diagram, as shown in Figure 3. The first three phases involved undertaking the SWMP study, whilst the fourth phase involves producing and implementing an action plan which is devised based on the evidence gained from the first three phases.

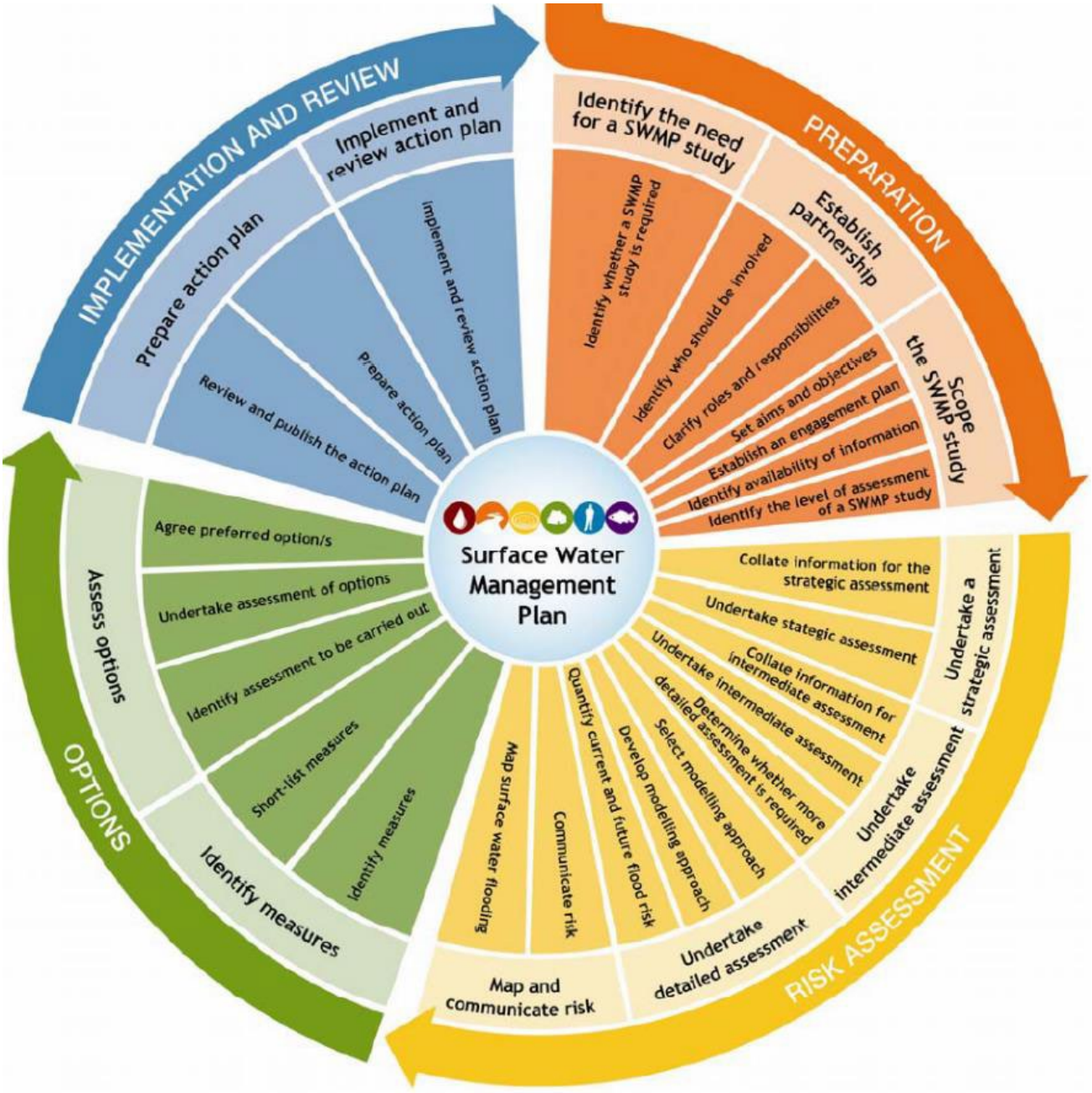


Figure 3: Defra wheel (taken from SWMP technical guidance)

There are currently no SWMPs which have been undertaken in South Oxfordshire or Vale of White Horse, however any future SWMPs carried out in the district must be considered by the Local Plan.

There is a strategic objective within the Oxfordshire LFRMS to *"improve understanding of surface water flood risks through targeted detailed investigations (surface water management plans)"*.

A.4.5 Government response to the National Infrastructure Commission's study: Reducing the risk of surface water flooding, March 2024

Following the review into making sustainable drainage systems mandatory in new developments, published on 10 January 2023, Government has committed in its integrated plan for delivering clean and plentiful water to requiring standardised sustainable drainage systems in new developments in 2024, subject to final decisions on scope, threshold and process. Government expects to have finalised the implementation pathway by the end of 2024.

Government will consult on reforms to local flood risk management planning throughout 2024 which will include considering how local areas can best set measurable outcomes for flood risk in their areas and catchments, for all sources of flood risk to drive local action and progress. Future plans will support an integrated approach which promotes joined up action across the whole of an area or catchment, including upstream and downstream, and taking into account the impacts to surrounding areas.

By 2026, Government will look to have reformed local flood risk management planning to deliver strategic and comprehensive plans, which support long-term local action and investment. They will take an adaptive approach which accounts for climate change, identify opportunities to achieve multiple benefits, demonstrate clear accountability and transparency.

A review into the statutory powers and responsibilities around managing and maintaining flood assets, including those for surface water management will be concluded in 2024. This will be used to inform future policy and delivery actions.

By summer 2024 Government will produce national guidance on Section 19 investigations, improving good practice and enabling trend analysis. This will further enable RMAs to share knowledge, experience and enable better risk mitigation measures.

A.4.6 Water Cycle Studies

The purpose of a Water Cycle Study (WCS) is to investigate whether the local water environment has the capacity to support planned levels of growth and provide a comprehensive and robust evidence to support Local Plan production.

To achieve this, the WCS investigates the capability of the water and sewerage suppliers to provide the services to enable housing and economic growth and identify key risks to the timing of housing delivery and impacts on customers and the local environment. A WCS is certainly useful in the Local Plan Examination, where there is large growth and urban expansion planned within a local authority area.

At the time of writing, South Oxfordshire and Vale of White Horse District Councils are preparing a Water Cycle Study to support their Joint Local Plan.

A.4.7 Green Infrastructure and Open Space assessments

Open space, or Green Infrastructure (GI), should be designed and managed as a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits for local communities and should be provided as an integral part of all new development, alongside other infrastructure such as utilities and transport networks. Open greenspace can be used to mitigate flood risk.

Local Plans should account for increased flood risk, resulting from climate change, through the planning of GI. GI can have an important role to play in reducing the likelihood of flooding by providing space for flood storage, reducing runoff and increasing infiltration, whilst also providing social and economic benefits.

Alongside GI should be the implementation of SuDS (see Section 6.7 of the main report). The suitability of GI and SuDS can be informed by this SFRA through utilisation of open space for water in the areas of greatest flood risk, which would be key to helping deliver sustainable development.

Examples include:

- Restoration of natural character of floodplains;
- Reduction of downstream flood risk;
- Preserving of areas of existing natural floodplain; and
- Introduction of new areas and enhancing existing areas of greenspace whilst incorporating sustainable drainage within new development.

The Town and Country Planning Association together with the Wildlife Trusts produced a guidance document for Green Infrastructure[19]. The guidance states that local plans should identify funding sources for GI and provision should be made for GI to be adequately funded as part of a development's core infrastructure. For new developments, GI assets can be secured from a landowner's 'land value uplift' and as part of development agreements. LPAs may include capital for the purchase, design, planning and maintenance of GI within the Community Infrastructure Levy (CIL) programme.

A.4.8 Flood risk and catchment partnerships

The Catchment Based Approach (CaBA) embeds collaborative working at a river catchment scale to deliver cross cutting improvements to our water environments. The CaBA partnerships drive cost-effective practical delivery on the ground, resulting in multiple benefits including reduced flood risk and resilience to climate change.

19 Planning for a Healthy Environment - Good Practice Guidance for Green Infrastructure and Biodiversity | Town and Country Planning Association and The Wildlife Trusts | 2012

Catchment partnerships are groups of organisations with an interest in improving the environment in the local area and developing and integrated approach to managing risk within whole catchments. Catchment partnerships are led by catchment host organisations. The partnerships work on a wide range of issues, including the water environment but also address other concerns that are not directly related to river basin management planning.

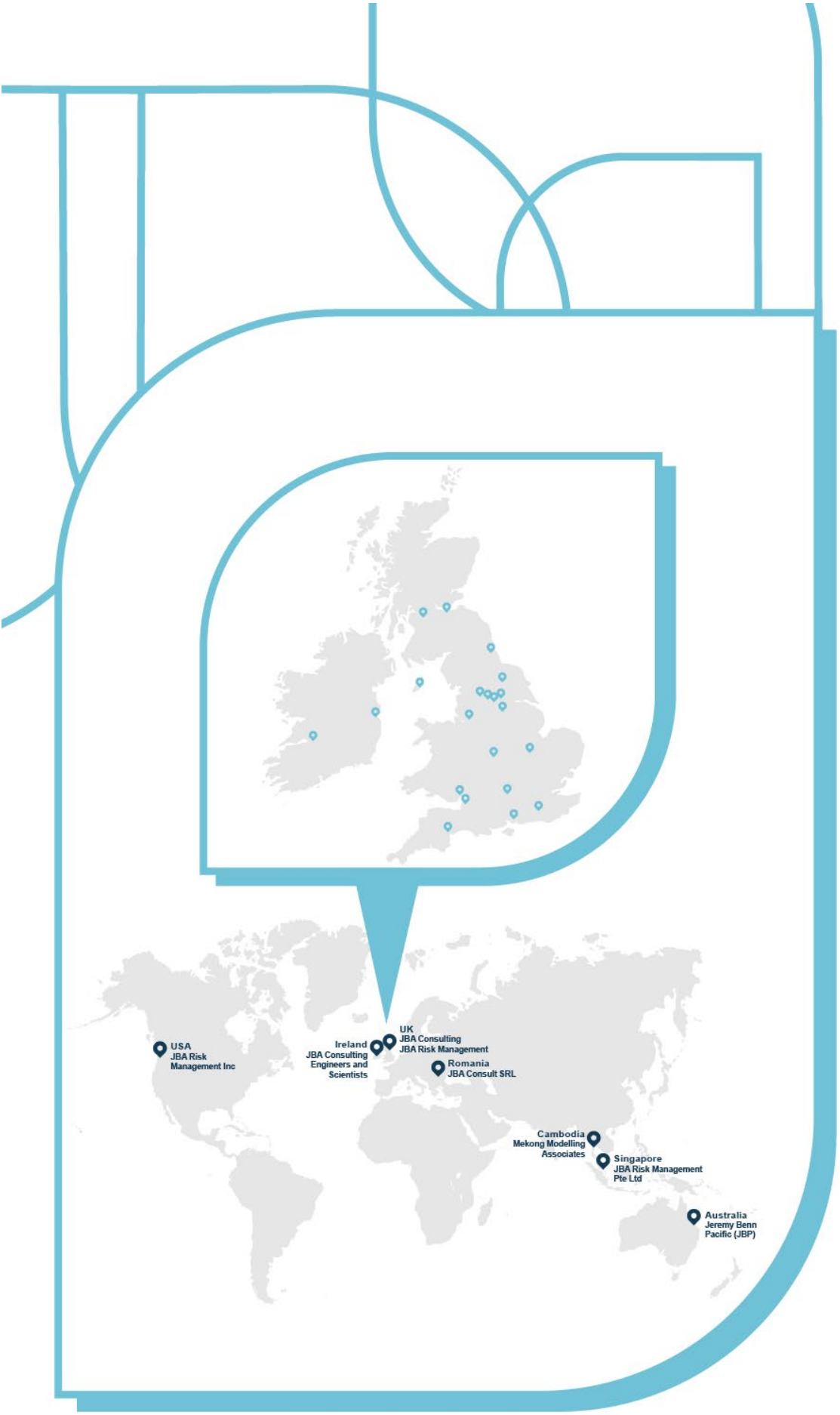
Catchment partnerships relevant to South Oxfordshire and Vale of White Horse include:

- Ock[20]
- Thame[21]
- South Chilterns[22]
- Upper Thames[23]

South Oxfordshire and Vale of White Horse District Councils have been involved in the development of several partnerships designed to provide collaboration between public agencies, businesses and the community. Partnerships and plans that affect the districts include:

- Thames Valley Local Resilience Forum,
- Oxfordshire County Council Community Risk Register,
- Oxfordshire County Council Flood Toolkit,
- Thames Regional Flood and Coastal Committee.
- Flood warning and awareness in partnership with the EA,
- Local flood plans, and
- Key businesses and organisations.

20 Ock Catchment Partnership
21 Thame Catchment Partnership
22 South Chilterns Catchment Partnership
23 Upper Thames Catchment Partnership



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South Oxfordshire and Vale of White Horse Level 1 SFRA - Appendix B

Functional Floodplain Delineation Methodology

Final Report

September 2024

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

Contents

List of Tables

1 Introduction

The Flood Risk and Coastal Change Planning Practice Guidance[1] (FRCC-PPG) states that local planning authorities (LPA) should identify in their Strategic Flood Risk Assessments (SFRA) areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency (EA). The South Oxfordshire and Value of White Horse functional floodplain (Flood Zone 3b) extent has therefore been delineated as part of this Level 1 SFRA using the most up-to-date data available from the EA. The previous functional floodplain extents, delineated for the 2019 and 2018 SFRAs for South Oxfordshire and Vale of White Horse respectively, have been significantly updated and superseded by more up-to-date modelled outputs, by the June 2024 version of Flood Zone 3, or by the June 2024 version of the medium risk event of the Risk of Flooding from Surface Water. This methodology note explains the delineation process.

Note that Flood Zone 3b is not included in the Flood Map for Planning. EA guidance states that the Level 1 SFRA should define the functional floodplain. This SFRA therefore sub-divides Flood Zone 3 into Flood Zone 3a and Flood Zone 3b. This distinction is for the use of LPAs and developers in development planning. Flood Zone 3a can be considered to be Flood Zone 3 of the Flood Map for Planning that is not functional floodplain.

The LPA, Lead Local Flood Authority (LLFA) and the EA must all agree on the extent of the functional floodplain outline and the methodology used. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. The local knowledge of the LPA, LLFA and the EA is therefore crucial in defining the functional floodplain as robustly and realistically as possible.

1 Flood Risk and Coastal Change Planning Practice Guidance | UK Government | 2022

2 Functional floodplain definition

The EA's SFRA guidance[2] states that the Level 1 SFRA should include the functional floodplain extent on maps with a detailed explanation of how the functional floodplain was defined. This methodology note provides this definition.

The EA's SFRA guidance (2024) and FRCC-PPG (2022) state that functional floodplain should show land that:

- *"would flood from rivers or the sea with an annual probability of 1 in 30 (3.3%) or greater in any year, with flood risk management features and structures operating effectively*
- *would normally form the river channel*
- *is designed to flood (such as flood attenuation schemes), even if it would only flood in more extreme events (such as 0.1% annual probability)."*

Regarding the impact of defences on the functional floodplain:

"In any modelling used to identify the functional floodplain, include existing defences and other flood risk management features and structures.

You may not need to designate the functional floodplain in locations where evidence shows flooding would be prevented by existing:

- *flood defences*
- *flood risk management features or structures*
- *buildings."*

Regarding the impact of existing buildings on the functional floodplain:

"The footprints of existing buildings may be removed from functional floodplain extents. However, it may be simpler to include existing buildings and use local policies to control the redevelopment or changes of use that may be acceptable.

Use local policies or guidance to explain the approach you will take when buildings are demolished in functional floodplain. It may be reasonable to assume that sites revert to functional floodplain when buildings have been demolished for more than a year".

If there is not enough detailed modelled information available to identify the functional floodplain, this should be made clear on the Level 1 SFRA maps to ensure risk isn't underestimated. In these areas, site-specific flood risk assessments should determine whether a site is affected by functional floodplain through additional modelling. If sites are proposed for development in such areas in the local plan, a Level 2 SFRA will be required to robustly map the functional floodplain extent.

2 How to Prepare a Strategic Flood Risk Assessment | Environment Agency | 2024

3 Functional floodplain delineation

3.1 Datasets

Based on the above guidance, the modelled flood outlines (MFO) listed in Table 3-2 below were provided by the EA to assist in the delineation of the functional floodplain extent, which supersedes the previous extents covering the study area. Where possible, direct modelling of the present and future 3.3% AEP event has been used to delineate Flood Zone 3b in areas where there are accepted and finalised models. There are a number of exceptions to this, noted within Table 3-1, where the 3.3% AEP event was not available.

Table 3-1: Proxy approaches for models without 3.3% AEP event available

Model	Proxy approach
Bradfords Brook	1% AEP event
Chalgrove Brook (Chalgrove)	2% AEP event
Cherwell	1% AEP event
Cole EDA	1% AEP event
Didcot Valley Park	1% AEP event
Letcombe Brook	1% AEP event
Moor Ditch	1% AEP event
North East Didcot	1% AEP event
Northfield & Littlemore Brooks	1% AEP event
Pang & Sulham Brook	1% AEP event
South Moreton	1% AEP event
Stert	1% AEP event
Thames (St johns to Shifford)	1% AEP event

The hierarchy of methods used to define Flood Zone 3b is outlined below:

1. Use of the 3.3% AEP from detailed model outputs where they are available. Only final and approved model outputs have been used to delineate Flood Zone 3b (Table 3-2).
2. Use of a proxy approach in areas subject to detailed modelling, where approximate outputs are available (e.g. in areas where outputs for the 3.3% AEP event are not available, but where alternative AEP events are available and can be used as a proxy) (Table 3-1).
3. Use the current Flood Zone 3 (June 2024) outline in areas where no detailed modelling outputs are available (Table 3-3).

4. Use of the 1% AEP Risk of Flooding from Surface Water outline along ordinary watercourses in the absence of detailed modelling and Flood Zone 3.
5. Use of the buffered watercourse (8 metres either side of the channel) and delineated Flood Storage Area layers (Table 3-3).

Table 3-2: EA modelled flood outlines

Model	Year	AEP used to define Flood Zone 3b	Defended?
Assendon Stream (Middle Assendon to Thames confluence)	2014	3.3%	No
Bradfords Brook (Wallingford)	2009	1%	No
Chalgrove Brook (Chalgrove)	2022	2%	Yes
Chalgrove Brook (Watlington)	2016	3.3%	No
Cherwell (Thrupps Bridge to Thames Confluence)	2006	1%	Yes
Cole EDA (A419 to South Marston Brook)	2011	1%	No
Didcot Valley Park	2019	1%	No
Ewelme Stream (Benson)	2019	3.3%	No
Ginge Brook	2018	3.3%	No
Letcombe Brook	2009	1%	Yes
Moor Ditch (Didcot to Thames Confluence)	2007	1%	No
North East Didcot FRA	2014	1%	No
Northfield & Littlemore Brooks	2011	1%	No
Ock (East Hanney to Thames Confluence)	2017	3.3%	No
Pang & Sulham Brook (M4 to Thames Confluence)	2016	1%	Yes

Model	Year	AEP used to define Flood Zone 3b	Defended?
South Moreton (Flood Map Challenge)	2019	1%	No
Stert (A34 to Thames Confluence)	2012	1%	Yes
Thames (Eynsham to Sandford)	2018	3.3%	Yes
Thames (Pangbourne to Sonning)	2019	3.3%	No
Thames (Sandford to Pangbourne)	2018	3.3%	No
Thames (Sonning to Hurley)	2019	3.3%	No
Thames (St Johns to Shifford)	2011	1%	No
Thames (MRL to St Johns)	2014	2%	Yes

Along with the MFOs listed in Table 3-2, the datasets in

Table 3-3 were also used to assist with the delineation. The EA's Flood Storage Area (FSA) dataset was interrogated and it was found that there were no FSA's within the study area to be included within the functional floodplain outline.

Table 3-3: Additional datasets

Dataset	Purpose
Flood Zone 3 - EA Flood Map for Planning	Dataset version June 2024 Use of this dataset in areas not subject to detailed modelling will reflect outputs from the national generalised modelling exercise that are incorporated into Flood Zone 3.
1% AEP extent - EA Risk of Flooding from Surface Water	Dataset version June 2024. Use of this dataset in areas not subject to detailed modelling or not covered by Flood Zone 3 will reflect the risk of flooding from ordinary watercourses.
Flood Storage Areas - EA Flood Map for Planning	Dataset version June 2024. The dataset was interrogated and it was found that there were no FSA's within the study area to be included within the functional floodplain outline
Watercourse Link - OS Open Rivers	To create river channel areas within Flood Zone 3b as requested by EA SFRA guidance. This dataset includes only watercourses and does not include waterbodies. The dataset has been buffered by 8m either side of the line to broadly represent the width of the watercourse across the area. It is recognised that this is an approximation. Policy relating to Flood Zone 3b applies to the watercourse and not the mapping where they are different.

4 GIS methodology

The below steps summarise the methodology used to delineate the functional floodplain:

- The previous Flood Zone 3b outlines were used as a starting point and the MFOs listed in Table 3-2 were appended to update the outline.
- Flood Zone 3 (June 2024) has been used to define Flood Zone 3b in areas not subject to detailed modelling. This may be a conservative approach, however, in the absence of other better information, Flood Zone 3b policy should relate to these areas. The future delineation of Flood Zone 3b should draw on outputs from new detailed modelling exercises when they are completed to refine and improve the dataset, either as part of an update to this Level 1 SFRA or through a more detailed Level 2 SFRA.
- The 1% AEP Risk of Flooding from Surface Water extent (June 2024) has been used to define Flood Zone 3b along ordinary watercourses not covered by detailed modelling or Flood Zone 3.
- All river channels including culverted sections were added to the Flood Zone 3b outline, as required by the EA's guidance. It is noted that the river channel dataset used (OS Open Rivers Dataset, Watercourse Link Shapefile) is a high level dataset that may not be spatially correct in many areas. At a local scale, this could lead to inaccuracies, especially in hydrologically complex areas where there are man-made interactions or interactions with other bodies of water such as reservoirs or canals. Recognising this, Flood Zone 3b policy relates to the watercourse including an 8m buffer either side of the channel and not the mapping where they are different.
- The river channel dataset includes a high-level and approximate representation of culverted sections of watercourses. These (culverted) sections are subject to a higher degree of uncertainty as it is more difficult to identify and verify below ground alignments. Within culverted sections, Flood Zone 3b policy relates to the actual confirmed alignment of culverted sections identified through site investigation rather than the alignment shown in Flood Zone 3b outputs where datasets differ. The EA and LLFA may be able to advise on the culverted sections in Flood Zone 3b.
- The river channel dataset contains open river channels and culverted sections of channel only and does not include other types of waterbody such as reservoirs, lakes or ponds.
- Waterbodies, such as canals and reservoirs, are only included in the delineated Flood Zone 3b outline where they are present within detailed models that have been used. There is no reliable dataset to delineate waterbodies that can be used to delineate the Flood Zone 3b outline, however waterbodies should be considered as functional floodplain i.e. not developable.

- The EA's FSA dataset has been reviewed for inclusion in Flood Zone 3b, and it was found that there were no FSAs within the South Oxfordshire and Vale of White Horse authority areas.
- Buildings and infrastructure within the Flood Zone 3b outline have been retained within the outline i.e. they have not been removed on the assumption that floodwater ingress may occur. The guidance[3] states that you do not need to designate functional floodplain in locations where evidence shows flooding would be prevented, for example, by solid buildings. The SFRA should be supported by local policies to control the redevelopment or changes of use that may be acceptable.
- It has been assumed that any dry islands within the Flood Zone 3b outline should be considered as functional floodplain where these areas are within the Flood Zone 3 extent, and therefore manual edits have been made to include these dry islands within the outline.
- Each polygon within the Flood Zone 3b outline has been attributed with the source MFO or dataset, so it is possible to ascertain which model or dataset each polygon within the outline came from.
- Checks on the geometry of the Flood Zone 3b outline were carried out to ensure geometric correctness in GIS.

3 How to prepare a strategic flood risk assessment | Environment Agency | May 2024

5 Future functional floodplain dataset

In addition to the present day Flood Zone 3b outline, a future Flood Zone 3b outline, as advised in EA guidance, has been delineated. The present day updated Flood Zone 3b outline has been used as a starting point, as recommended in the EA's SFRA guidance. The present day outline has been updated using a proxy approach in the absence of up to date fluvial climate change modelling.

This process involved assessing the model inflows and aligning a 3.3% AEP + higher central climate change event with the nearest representative return period output, to act as a more accurate proxy, rather than defaulting to Flood Zone 3 which may be more conservative.

In instances where the 1% AEP event has been used as a proxy for the present day functional floodplain outline, Flood Zone 2 has been used as a proxy to represent the functional floodplain plus climate change outline along the modelled reach. These instances are noted below:

- Bradfords Brook (Wallingford) 2009
- Cherwell (Thrupps Bridge to Thames Confluence) 2006
- Cole EDA (A419 to South Marston Brook) 2011
- Didcot Valley Park 2019
- Letcombe Brook 2009
- Moor Ditch (Didcot to Thames Confluence) 2007
- North East Didcot FRA 2014
- Northfield & Littlemore Brooks 2011
- Pang & Sulham Brook (M4 to Thames Confluence) 2016
- South Moreton (Flood Map Challenge) 2019
- Stert (A34 to Thames Confluence) 2012
- Thames (St Johns to Shifford) 2011

Where no detailed modelling exists, the existing Flood Zone 2 extent has been used to provide an extreme conservative assessment of the future functional floodplain. For ordinary watercourses where there is no national fluvial mapping available, the 1% RoFSW dataset has been used as a proxy to infer fluvial risk.

Table 5-1 indicates the model outputs that have been used to define the future functional floodplain.

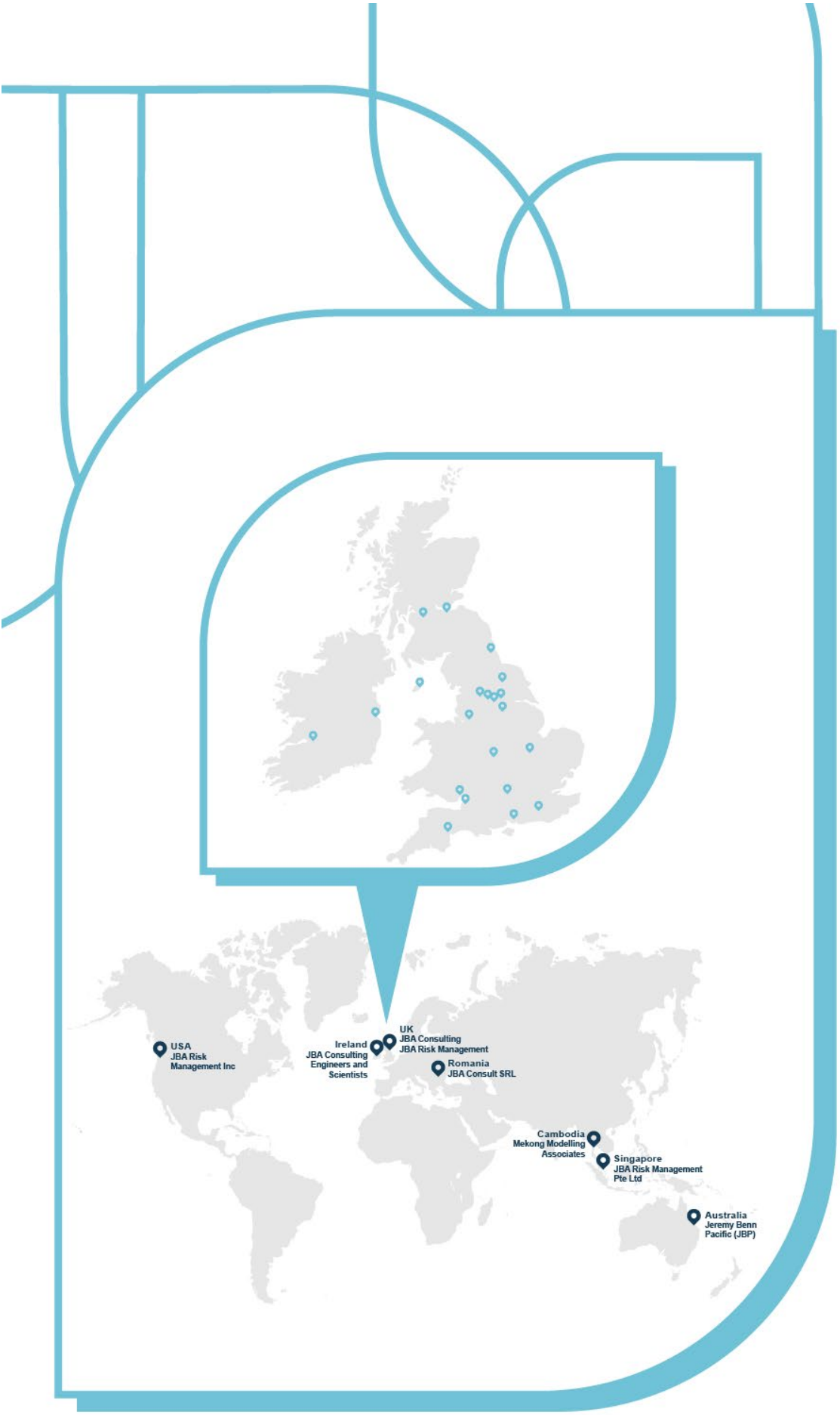
Table 5-1: Fluvial models included in future functional floodplain outline

Model	Year	Annual Exceedance Probability (AEP)	Defended?
Assendon Stream (Middle Assendon to Thames	2014	1%	No

Model	Year	Annual Exceedance Probability (AEP)	Defended?
confluence)			
Chalgrove Brook (Chalgrove)	2022	1%	Yes
Chalgrove Brook (Watlington)	2016	1%	No
Ewelme Stream (Benson)	2019	1%	No
Ginge Brook	2018	1.3%	No
Ock (East Hanney to Thames Confluence)	2017	2%	No
Thames (Eynsham to Sandford)	2018	0.5%	Yes
Thames (Sandford to Pangbourne)	2018	1%	No
Thames (Sonning to Hurley)	2019	1%	No

For the Thames (MRL to St Johns) 2014 model, the 2% AEP event plus 43% climate change flood extents were available to use to represent the future functional floodplain.

For the Thames (Pangbourne to Sonning) 2019 model, the 2% AEP event plus 25% climate change inflows provided the closest peak to the 3.3% AEP plus climate change flows. Therefore, this has been used to represent the future functional floodplain outline in the absence of 3.3% AEP plus climate change outline.



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Appendix C - Level 1 SFRA Local Plan Sites Assessment

South Oxfordshire and Vale of White Horse

Level 1 SFRA Local Plan Sites Assessment

18 September 2024

Summary Table

Proposed Use	Number of Sites	Area (ha)	Fluvial and Tidal Flood Zone Coverage: Flood Zone 1 Area (ha)	Flood Zone 1 No. 100%	Flood Zone 2 Area (ha)	Flood Zone 2 No.	Flood Zone 3a Area (ha)	Flood Zone 3a No.	Flood Zone 3b Area (ha)	Flood Zone 3b No.	Risk of Flooding from Surface Water: Low Risk (0.1% AEP event outline) Area (ha)	Low Risk No.	Medium Risk (1% AEP event outline) Area (ha)	Medium Risk No.	High Risk (3.3% AEP event outline) Area (ha)	High Risk No.	Risk of Flooding from Fluvial Climate Change: 1% AEP event + climate change (additional risk) Area (ha)	1% AEP + CC No.	FZ3b + Climate Change (additional risk) Area (ha)	FZ3b + CC No.
Residential	40	2912.74	2712.39	16	51.09	20	5.64	12	143.62	23	287.22	39	45.64	36	61.39	32	51.09	20	24.18	18
Employment	15	465.64	458.78	8	5.37	6	0.58	4	0.90	5	33.02	14	3.61	12	1.62	10	5.37	6	2.38	5
None Planned	0	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
Mixed	9	746.02	701.98	4	8.15	5	2.49	2	33.41	4	47.13	9	6.84	9	8.28	9	8.15	5	3.79	4
TOTAL	**64**	**4124.40**	**3873.15**	**28**	**64.61**	**31**	**8.71**	**18**	**177.93**	**32**	**367.37**	**62**	**56.09**	**57**	**71.30**	**51**	**64.61**	**31**	**30.35**	**27**

Key

Key	
Flood Zone 3b + Flood Zone 3b plus climate change	The colour coding shows the highest risk element of the flood zone that is present on site and is not in itself an indication of whether the site should or shouldn't be developed for flooding reason
Flood Zone 3a + Flood Zone 3a plus climate change	
Flood Zone 2	
Flood Zone 1 and Surface Water + Flood Zone 1 and Surface Water plus climate change	
Flood Zone 1	

Main Table

Site Reference	Site Name	Planning Permission	Proposed Use	Area (ha)	Fluvial Flood Zone Coverage: Flood Zone 1 Area (ha)	Flood Zone 1 %	Flood Zone 2 Area (ha)	Flood Zone 2 %	Flood Zone 3a Area (ha)	Flood Zone 3a %	Flood Zone 3b Area (ha)	Flood Zone 3b %	Risk of Flooding from Surface Water: Low Risk (0.1% AEP event outline) Area (ha)	Low Risk %	Medium Risk (1% AEP event outline) Area (ha)	Medium Risk %	High Risk (3.3% AEP event outline) Area (ha)	High Risk %	Risk of Flooding from Fluvial Climate Change: 1% AEP event + climate change (additional risk) Area (ha)	1% AEP + CC %	FZ3b + Climate Change (additional risk) Area (ha)	FZ3b + CC %	Site at reservoir risk?	Site at high groundwater risk?	Flood Risk Vulnerability Classification (NPPF)	Level 1 Strategic Recommendation (see SFRA Report)
AS1	Land at Berinsfield Garden Village	No	Mixed	132.5199	126.2724	95.2856	0.7969	0.6013	0.0000	0.0000	5.4506	4.1131	3.9198	2.9579	0.6334	0.5757	0.1295	0.0977	0.7969	0.6013	0.7969	0.6013	No	Yes	More vulnerable	Strategic Recommendation A
AS2	Land adjacent to Culham Campus	No	Mixed	217.4304	189.9052	87.3407	5.2606	2.4194	2.4715	1.1367	19.7931	9.1032	6.4920	2.9858	0.8000	0.6327	0.5757	0.2648	5.2606	2.4194	2.4715	1.1367	Yes	Yes	More vulnerable	Strategic Recommendation A
AS3	Land South of Grenoble Road, Edge of Oxford	No	Mixed	152.6437	144.7340	94.8181	0.2588	0.1695	0.0232	0.0152	7.6279	4.9972	25.3602	16.6139	3.3905	6.5296	6.5766	4.3084	0.2588	0.1695	0.2819	0.1847	No	Yes	More vulnerable	Strategic Recommendation A
AS4	Land at Northfield, Edge of Oxford	No	Residential	68.0458	55.3669	81.3671	1.9000	2.7922	1.3978	2.0541	9.3811	13.7865	14.8717	21.8555	2.4742	11.0531	5.0470	7.4170	1.9000	2.7922	3.2978	4.8464	No	Yes	More vulnerable	Strategic Recommendation A
AS5	Land at Bayswater Brook, Edge of Oxford	No	Residential	105.0799	92.5145	88.0421	3.5011	3.3318	0.0025	0.0024	9.0618	8.6237	21.7716	20.7191	2.7918	7.7923	5.3963	5.1354	3.5011	3.3318	3.5036	3.3342	No	Yes	More vulnerable	Strategic Recommendation A
AS6	Rich's Sidings and Broadway, Didcot	No	Mixed	2.9590	2.9590	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2241	7.5742	0.0295	2.6050	0.0475	1.6066	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation B
AS7	Didcot Gateway, Didcot	Partial	Mixed	4.3444	4.3444	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0050	46.1511	0.4177	19.8025	0.4426	10.1871	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation B
AS8	North West of Grove, Grove	No	Residential	28.3667	28.3667	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.9617	6.9155	0.1909	1.3953	0.2049	0.7223	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
AS9	North West of Valley Park, Didcot	No	Residential	33.2790	27.5707	82.8472	1.0689	3.2118	0.0488	0.1467	4.5906	13.7943	2.0041	6.0221	0.7356	4.5613	0.7823	2.3508	1.0689	3.2118	1.1177	3.3585	No	No	More vulnerable	Strategic Recommendation A
AS10	Land at Dalton Barracks Garden Village, Shippon	No	Mixed	145.5169	144.9488	99.6096	0.0332	0.0228	0.0000	0.0000	0.5348	0.3675	4.8447	3.3293	0.8832	0.8088	0.2938	0.2019	0.0332	0.0228	0.2429	0.1669	No	Yes	More vulnerable	Strategic Recommendation A
AS11	Culham Campus	Partial	Employment	77.3504	77.3504	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.2148	10.6202	1.0106	2.6546	1.0428	1.3481	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation B
AS12	Harwell Campus	Partial	Employment	282.2558	282.2558	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	9.9530	3.5262	0.7886	0.3170	0.1061	0.0376	0.0000	0.0000	0.0000	0.0000	No	No	Less vulnerable	Strategic Recommendation B
AS16	Vauxhall Barracks, Didcot	No	Mixed	9.8729	9.8729	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4299	4.3546	0.0540	0.7986	0.0248	0.2514	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation B
HOU2v	North West of Abingdon-on-Thames	Partial	Residential	12.6104	8.9612	71.0619	2.5476	20.2024	0.8730	6.9226	0.2286	1.8131	0.5440	4.3135	0.0415	0.8031	0.0598	0.4744	2.5476	20.2024	3.4206	27.1250	No	Yes	More vulnerable	Strategic Recommendation A
JT1a	Southmead Industrial Estate, Didcot	No	Employment	2.6388	2.5525	96.7280	0.0000	0.0000	0.0000	0.0000	0.0863	3.2720	0.2979	11.2900	0.1311	5.5590	0.0156	0.5916	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation A
JT1b	Grove Technology Park	No	Employment	13.2244	13.2244	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1083	0.8189	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation C
JT1d	Hithercroft Industrial Estate, Wallingford	Partial	Employment	1.1066	1.1066	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1421	12.8445	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation C
JT1e	Monument Business Park, Chalgrove	Partial	Employment	2.2514	2.2514	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9214	40.9251	0.1292	14.5587	0.1986	8.8206	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation B
JT1f	Abingdon Science Park	Partial	Employment	16.7195	14.6144	87.4091	1.6756	10.0217	0.1672	1.0000	0.2624	1.5691	6.3310	37.8656	0.5386	3.4560	0.0393	0.2348	1.6756	10.0217	0.9734	5.8218	No	Yes	Less vulnerable	Strategic Recommendation A
JT1i	Former Esso Research Centre	No	Employment	11.0219	11.0219	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2660	2.4130	0.0152	0.1380	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	No	Less vulnerable	Strategic Recommendation B
JT1k	South of Park Road, Faringdon	Partial	Employment	27.8700	27.8700	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4263	1.5295	0.0665	0.4941	0.0712	0.2556	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation B
SH574	Former South Oxfordshire District Council offices, Crowmarsh Gifford	No	Mixed	2.7793	0.9810	35.2961	1.7983	64.7039	0.0000	0.0000	0.0000	0.0000	0.8855	31.8614	0.2962	12.2201	0.0435	1.5643	1.7983	64.7039	0.0000	0.0000	Yes	No	More vulnerable	Strategic Recommendation B
SH602	Land north of Wallingford	No	Residential	21.4720	21.4720	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3979	1.8529	0.1113	0.7084	0.0408	0.1901	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
SH605	Land off Wantage Road, Wallingford	No	Residential	55.0405	55.0405	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.5326	4.6014	0.2287	0.6104	0.1073	0.1949	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
SH609	Land at Cholsey Fields, Cholsey	No	Residential	28.4366	28.4366	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1826	4.1588	0.3070	1.5254	0.1268	0.4460	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
SH628	Richmead Park	No	Residential	60.3071	60.2976	99.9842	0.0000	0.0000	0.0000	0.0000	0.0095	0.0158	1.9819	3.2863	0.0872	0.2291	0.0509	0.0844	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation A
SH649	Blackditch Farm	No	Residential	25.8118	24.9946	96.8339	0.0289	0.1118	0.0229	0.0887	0.7654	2.9655	4.5941	17.7985	1.4285	8.0800	0.6571	2.5457	0.0289	0.1118	0.0518	0.2006	No	Yes	More vulnerable	Strategic Recommendation A
SH668	Chalgrove Airfield	No	Residential	444.3167	419.7045	94.4606	3.4207	0.7699	0.0000	0.0000	21.1916	4.7695	47.5236	10.6959	9.1696	4.8816	12.5201	2.8178	3.4207	0.7699	3.4207	0.7699	Yes	Yes	More vulnerable	Strategic Recommendation A
SH685	Land southwest of Chinnor	No	Residential	51.2856	51.2241	99.8801	0.0000	0.0000	0.0000	0.0000	0.0615	0.1199	0.1153	0.2249	0.0423	0.0824	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation A
SH692	South Fleet	No	Residential	33.4928	33.4928	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0402	0.1200	0.0071	0.0211	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation B
SH787	Land Off Wantage Road	No	Mixed	77.9585	77.9585	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.9674	3.8063	0.3399	0.6259	0.1481	0.1900	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
SH811	Land south west of Thame (Highfields)	No	Residential	40.2732	35.9481	89.2606	0.7664	1.9029	0.0000	0.0000	3.5587	8.8365	11.7775	29.2439	2.7500	15.2673	3.3986	8.4389	0.7664	1.9029	0.7664	1.9029	Yes	No	More vulnerable	Strategic Recommendation A
SH816	Land southeast of Moorend Lane, Thame, OX9 3JL	No	Residential	30.9479	30.9479	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3838	1.2400	0.0144	0.0466	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
SH830	Land to the North of the A329 at Cholsey	No	Residential	33.2729	33.2729	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7287	2.1902	0.0965	0.4104	0.0400	0.1204	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
VH128	Kingston Bagpuize House	No	Residential	7.6157	7.6157	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0226	0.2968	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation C
VH139	Land at Crown Packaging, Wantage	No	Residential	7.0236	7.0236	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0685	0.9746	0.0092	0.3306	0.0140	0.1995	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
VH235	Land at The Potting Shed Nursery, Longworth	No	Residential	5.1317	5.1317	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4276	8.3325	0.1393	3.9861	0.0652	1.2715	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
VH267	Land at The Croft and Little Croft, Milton Heights	No	Residential	3.2519	3.2519	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0524	1.6123	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation C
VH288	Land to the south of East Hanney	No	Residential	43.5290	41.5482	95.4494	1.7573	4.0371	0.0028	0.0064	0.2207	0.5071	1.2694	2.9162	0.1835	0.9481	0.2292	0.5266	1.7573	4.0371	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation A
VH290	Grove Road, Wantage OX12 7BZ	No	Residential	3.6397	2.9903	82.1573	0.3717	10.2129	0.0000	0.0000	0.2777	7.6298	0.7496	20.5936	0.1059	5.6400	0.0994	2.7301	0.3717	10.2129	0.3717	10.2129	No	Yes	More vulnerable	Strategic Recommendation A
VH310	Land north of Reading Road and Grove Road, Harwell OX11 0HT	No	Residential	35.4367	35.4367	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0782	3.0427	0.0968	0.7524	0.1698	0.4792	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
VH314	Haynes of Challow, Roadside Farm	No	Residential	3.5243	3.5243	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1681	4.7696	0.0268	1.7982	0.0366	1.0372	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation B
VH376	Land at Old Mill Nurseries, Upper Green, Stanford-in-the-Vale	No	Residential	3.1806	2.8973	91.0903	0.0161	0.5061	0.0000	0.0000	0.2673	8.4036	0.0031	0.0983	0.0000	0.0000	0.0000	0.0000	0.0161	0.5061	0.0161	0.5061	No	Yes	More vulnerable	Strategic Recommendation A
VH381	Land adjacent to Peewit Farm, 95 Drayton Road, Drayton	No	Residential	3.7598	3.7585	99.9651	0.0013	0.0349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0349	0.0000	0.0000	Yes	Yes	More vulnerable	Strategic Recommendation B
VH386	Land to the South of Marcham	No	Residential	47.2850	34.5600	73.0887	5.3448	11.3034	1.7075	3.6110	5.6727	11.9969	4.0330	8.5292	0.2185	0.5077	0.0216	0.0457	5.3448	11.3034	0.9841	2.0812	No	Yes	More vulnerable	Strategic Recommendation A
VH399	Tulwick Park, Grove	No	Residential	47.9473	47.9473	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.4155	2.9523	0.1681	0.4266	0.0364	0.0760	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
VH400	Land south of Shrivenham	No	Residential	31.6287	31.6287	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.4118	23.4337	1.4205	12.6506	2.5807	8.1593	0.0000	0.0000	0.0000	0.0000	No	No	More vulnerable	Strategic Recommendation B
VH403	Land east of Hendred	No	Residential	124.6673	123.4602	99.0318	0.1607	0.1289	0.0288	0.0231	1.0175	0.8162	1.3343	1.0703	0.2711	0.3866	0.2108	0.1691	0.1607	0.1289	0.0265	0.0212	No	Yes	More vulnerable	Strategic Recommendation A
VH404	Land north of Grove	No	Residential	409.2818	372.2005	90.9399	15.4380	3.7720	0.6200	0.1515	21.0234	5.1367	32.2749	7.8857	3.9965	1.8639	3.6321	0.8874	15.4380	3.7720	0.1644	0.0402	No	Yes	More vulnerable	Strategic Recommendation A
VH541	Land at Drayton East Way and Land South of Drayton Road, Land at Drayton East Way and Land South of Drayton Road, Drayton	No	Residential	37.5326	32.8713	87.5807	0.1749	0.4659	0.4798	1.2783	4.0066	10.6750	0.8180	2.1794	0.0084	0.0223	0.0000	0.0000	0.1749	0.4659	0.4527	1.2062	No	Yes	More vulnerable	Strategic Recommendation A
VH544	Land North of the A420 at Shrivenham, Sandhill Farm, Shrivenham, SN6 8BH	No	Residential	220.9972	213.3514	96.5403	1.4035	0.6351	0.0000	0.0000	6.2423	2.8246	11.7194	5.3030	1.8970	2.6749	4.0145	1.8165	1.4035	0.6351	1.4035	0.6351	Yes	Yes	More vulnerable	Strategic Recommendation A
VH560	Land South of Majors Road, Watchfield, SN7 7TR, Majors Road, Watchfield, SN7 7TR	No	Residential	33.1964	26.1032	78.6326	0.0000	0.0000	0.0000	0.0000	7.0932	21.3674	18.6102	56.0607	2.7963	22.4138	4.6443	13.9903	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation A
VH590	Land at South Abingdon, Drayton road, Abingdon	No	Residential	87.9920	79.7991	90.6891	1.5010	1.7058	0.0504	0.0573	6.6415	7.5479	8.7052	9.8932	0.9696	4.3926	2.8956	3.2907	1.5010	1.7058	0.0224	0.0255	No	Yes	More vulnerable	Strategic Recommendation A
VH606	Land north of Crab Hill, Grove, Wantage	No	Residential	191.9754	189.6460	98.7866	0.0000	0.0000	0.0000	0.0000	2.3295	1.2134	20.2179	10.5315	1.5746	2.0328	2.3278	1.2125	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation A
VH611	Land to the North of Grove and to the East and West of the A338 Wider Opportunity, n/a, Grove, n/a	No	Residential	333.0788	290.4850	87.2121	9.2583	2.7796	0.4016	0.1206	32.9339	9.8877	52.8574	15.8693	10.1983	6.3788	11.0480	3.3169	9.2583	2.7796	2.7323	0.8203	No	Yes	More vulnerable	Strategic Recommendation A
VH627	Land north east of Watchfield, Majors Road, Watchfield	No	Residential	51.5724	51.5724	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5.7685	11.1853	0.3520	0.8839	0.1039	0.2014	0.0000	0.0000	0.0000	0.0000	No	Yes	More vulnerable	Strategic Recommendation B
VH656	Shrivenham Park Golf Club, Pennyhooks Lane, Shrivenham, SN6 8EX	No	Residential	28.7193	25.7886	89.7953	0.9170	3.1931	0.0000	0.0000	2.0137	7.0116	2.3202	8.0788	0.2998	2.2084	0.3344	1.1644	0.9170	3.1931	0.9170	3.1931	No	Yes	More vulnerable	Strategic Recommendation A
VH657	Land West of Wantage, North East of East Challow, Wantage/East Challow	No	Residential	78.7355	72.1878	91.6839	1.5118	1.9201	0.0000	0.0000	5.0360	6.3961	3.4828	4.4234	0.4318	1.1739	0.4925	0.6255	1.5118	1.9201	1.5118	1.9201	No	Yes	More vulnerable	Strategic Recommendation A
VH685	Abbey Shopping Centre and the Charter	No	Employment	2.5102	1.7399	69.3146	0.7703	30.6854	0.0000	0.0000	0.0000	0.0000	1.1942	47.5760	0.4078	18.2965	0.0514	2.0489	0.7703	30.6854	0.1894	7.5468	No	Yes	Less vulnerable	Strategic Recommendation A
VH694	Barton Mill in Audlett Drive, Abingdon	No	Employment	1.5290	1.4381	94.0552	0.0541	3.5366	0.0239	1.5659	0.0129	0.8423	0.2729	17.8479	0.0540	6.4824	0.0451	2.9511	0.0541	3.5366	0.0239	1.5659	Yes	Yes	Less vulnerable	Strategic Recommendation A
VH703	Shrivenham Hundred Business Park	No	Employment	5.3378	5.3378	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation C
VH708	Abingdon Science Park at Barton Lane	No	Employment	13.1783	11.0732	84.0258	1.6756	12.7147	0.1672	1.2688	0.2624	1.9908	4.3313	32.8671	0.4509	3.7193	0.0393	0.2979	1.6756	12.7147	0.9734	7.3862	Yes	Yes	Less vulnerable	Strategic Recommendation A
VH715	Drayton Road Industrial Estate	No	Employment	1.2093	0.0079	0.6514	0.9815	81.1625	0.2199	18.1860	0.0000	0.0000	0.2583	21.3564	0.0002	0.0184	0.0000	0.0000	0.9815	81.1625	0.0000	0.0000	No	Yes	Less vulnerable	Strategic Recommendation B
VH729	Land west of Grove Business Park	No	Employment	7.4315	6.9384	93.3645	0.2174	2.9259	0.0000	0.0000	0.2757	3.7096	0.3020	4.0633	0.0125	0.3690	0.0149	0.2011	0.2174	2.9259	0.2174	2.9259	No	Yes	Less vulnerable	Strategic Recommendation A

South Oxfordshire and Vale of White Horse Level 1 SFRA - Appendix D

Local Plan Sites Assessment

Final Report

September 2024

Prepared for:

South Oxfordshire District Council

Vale of White Horse District Council

Contents

List of Tables

1 Local plan sites assessment

Appendix D provides a strategic assessment of the suitability, relative to flood risk, of the sites to be considered for allocation in the Local Plan, summarising the outcomes of the screening assessment spreadsheet in Appendix C.

The information and guidance provided in this Appendix can be used by the LPA to inform the Joint Local Plan (JLP) and provide the basis from which to apply the Sequential Test in the development allocation and the development management process.

The LPA must use Appendix C to record their decisions on how to take each site forward or whether to remove a site from allocation, based on the evidence and strategic recommendations provided in this Level 1 SFRA. Recording decisions in the Sites Assessment Spreadsheet demonstrates that a sequential, sustainable approach to development and flood risk has been adopted.

South Oxfordshire and Vale of White Horse District Council's provided a GIS layer containing Joint Local Plan potential site allocations. The total number of sites assessed was 64. Note, the outcomes of the SFRA cannot influence decisions already made on parts of the site already with planning approval. The site-specific flood risk assessments accompanying the planning applications should still be representative of current risk.

To inform the Sequential Test for the allocation of development through the Local Plan, this assessment entails a high-level GIS screening exercise overlaying the JLP sites against Flood Zones 1, 2, 3a and 3b (the functional floodplain) and calculating the area of each site at risk. Flood Zones 1, 2 and 3 are sourced from the EA's Flood Map for Planning (Rivers and Sea). Flood Zone 3 is split into Flood Zone 3a and Flood Zone 3b (functional floodplain) as part of this Level 1 SFRA, as required by the National Planning Policy Framework (NPPF). The impacts of climate change have also been included in the sites screening process using the delineated Flood Zone 3b plus climate change outline and proxies for the 1% AEP event plus climate change. See Section 1.2 for details.

Surface water risk to assessed sites is analysed by way of the EA's national scale Risk of Flooding from Surface Water (RoFSW) dataset. The EA states that this dataset is not suitable for identifying whether an individual property will flood. It is recommended that the RoFSW is not displayed on basemapping more detailed than 1:10,000 as the data is open to misinterpretation if viewed at a greater or more detailed scale. Because of the way the RoFSW has been produced and the fact it is indicative, it is not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to surface water flooding at any scale without further supporting studies or evidence.

The effects of climate change on surface water flood risk have not been modelled at this stage.

All sources of flooding additional to fluvial and surface water also need to be considered in the sequential test. However, the datasets available for other risk sources are not of a level of detail consistent with those for fluvial and surface water, including for risk from groundwater, sewers and reservoir. These flood sources have therefore been considered separately in the sites assessment.

It is important to consider that each individual site will require further investigation, following this assessment, as local circumstances may dictate the outcome of the strategic recommendation. Such local circumstances are discussed in Section 1.1. The outcomes of the site assessments are presented in the Sites Assessment spreadsheet in Appendix C.

1.1 Screening of potential sites

This section of the report draws together the results included in the Sites Assessment Spreadsheet (Appendix C), produced from a GIS screening exercise. The LPA's should use the spreadsheet to identify which sites should be avoided during the Sequential Test. If sites cannot be directed to areas of low flood risk, or where wider strategic objectives require development in areas identified through this Level 1 SFRA to be at medium or high risk from flooding, then the LPA's should consider the compatibility of vulnerability classifications and flood zones and whether or not a more detailed Level 2 SFRA (including for application of the Exception Test where applicable) will be required before finalising sites for allocation in the JLP. Strategic recommendations are based on Tables 1 and 2 of the flood risk and vulnerability tables[1] of the Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) (Paragraphs 077 - 079), and Annex 3 of the National Planning Policy Framework[2].

The decision-making process on site suitability should be transparent and information from this SFRA should be used to justify decisions to allocate land in areas shown to be at high or medium risk of flooding.

The Sites Assessment Spreadsheet provides a breakdown of each site and the area (in hectares) and percentage coverage of each fluvial and surface water flood zone. Fluvial Flood Zones 3b, 3a, 2 and 1 are considered in isolation. Any area of a site within the higher risk Flood Zone 3b that is also within Flood Zone 3a is excluded from Flood Zone 3a and any area within Flood Zone 3a is excluded from Flood Zone 2. This allows for the sequential assessment of risk at each site by addressing those sites at higher risk first. The effects of climate change on fluvial flood risk have been assessed additionally to existing risk. Table 1-1 shows the proposed use of the sites and the number of sites within each fluvial flood zone and Table 1-2 shows the number of sites within each surface water flood zone.

1 Flood Risk and Coastal Change Planning Practice Guidance | GOV.UK | August 2022
2 National Planning Policy Framework | GOV.UK | December 2023

Table 1-1: Number of sites at risk from fluvial flooding

Proposed Use	Number of sites within each Flood Zone					
	Flood Zone 1*	Flood Zone 2	Flood Zone 3a	Flood Zone 3b	Flood Zone 3a + climate change	Flood Zone 3b + climate change
Residential	16	20	12	23	20	18
Employment	8	6	4	5	6	4
Mixed	4	5	2	4	5	4
TOTAL	**28**	**31**	**18**	**31**	**31**	**26**
*Sites with 100% area within Flood Zone 1 Note: sites may be in more than one flood zone. In reality, a site in Flood Zone 3a will also be within Flood Zone 2.						

Table 1-2: Number of sites at risk from surface water flooding

Proposed Use	Number of sites within each surface water risk category		
	Low risk zone (0.1% AEP event)	Medium risk zone (1% AEP event)	High risk zone (3.3% AEP event)
Residential	39	37	32
Employment	14	11	10
Mixed	9	9	9
TOTAL	**62**	**57**	**51**
Note: sites may be in more than one surface water risk category. In reality, a site in the high risk category will also be in the medium and low risk categories.			

The strategic recommendations are intended to assist the LPA in carrying out the Sequential Test and to highlight those sites at greatest flood risk. Table 1-3 shows the number of sites each strategic recommendation applies to:

- Strategic Recommendation A - recommend for withdrawal unless risk area can be avoided for development. Level 2 SFRA required to inform this;
- Strategic Recommendation B - Level 2 SFRA due to medium or high flood risk. Exception Test required if site is more vulnerable or essential infrastructure in Flood Zone 3a; and
- Strategic Recommendation C - allocate and progress to developer-led FRA as at low risk.

Table 1-3: Number of sites per strategic recommendation

Proposed Use	Number of sites assigned to each strategic recommendation		
	A	**B**	**C**
Residential	23	15	2
Employment	6	6	3
Mixed	4	5	0
TOTAL	**33**	**26**	**5**

It is important to note that each individual site will require further investigation before development is allocated, as local circumstances may dictate the outcome of the strategic recommendation. Such local circumstances may include the following:

- Flood depths and hazards will differ locally to each at risk site therefore modelled depth, hazard and velocity data should be assessed for the relevant flood event through a Level 2 SFRA;
- Availability of detailed climate change modelling;
- The RoFSW map is national scale and is not considered suitable for robustly identifying risk at the property level. For sites identified to be at medium or high risk from surface water based on the RoFSW, more detailed surface water modelling may reveal higher or lower risk to the site. The LLFA should be consulted when considering development viability at such sites;
- Current surface water drainage infrastructure, ground conditions and SuDS suitability are likely to differ at each site considered to be at risk from surface water flooding. Further investigation would therefore be required for any site at surface water flood risk. The LLFA should require that all planning applications must be accompanied by an appropriate drainage strategy, independent of the requirement for a site-specific FRA;
- If sites have planning permission but construction has not started, the SFRA will only be able to influence the design of the development e.g. finished floor levels. New, more extensive flood extents (from new or updated models) cannot be used to reject development where planning permission has already been granted following an agreed site-specific FRA;
- It may be possible at some sites to develop around the flood risk. Planners are best placed to make this judgement i.e. will the site still be deliverable if part of it needs to be retained to make space for floodwater? Yields may be impacted;
- Surrounding infrastructure may influence scope for layout redesign/removal of site footprints from risk;
- Some sites shown to be at low or very low risk may be at residual risk through the failure of defences during a flood event or through blockage/failure of drainage assets such as culverts;
- Safe and dry access and escape routes must exist at all times during a flood event, including for the extreme flood event, for emergency response and

evacuation. Emergency Planners should be consulted and appropriate emergency plans and flood warnings put in place;

- Current land use. A number of sites included in the assessment are likely to be brownfield, thus the existing development structure and footprint could be taken into account as further development may not lead to increased flood risk; and
- Existing planning permissions exist on some sites where the EA will have previously been consulted on and any agreed remedial works concerning flood risk actioned. Previous flood risk assessments should already have been carried out at these sites.

1.1.1 Strategic Recommendation A - recommend for withdrawal unless risk area can be avoided for development. Level 2 SFRA required to inform this

This strategic recommendation does not take into account local circumstances, only that part of the site area falls within a flood zone.

Strategic Recommendation A applies to any site where the following criteria is true:

- Any proportion of the site area is within the functional floodplain. The FRCC-PPG flood risk vulnerability classification states that only water compatible uses and essential infrastructure should be permitted in the functional floodplain, though any essential infrastructure must pass the Exception Test and water compatible uses must be designed and constructed to remain operational and safe for users in times of flood; must result in no net loss of floodplain storage; and must not impede water flows and not increase flood risk elsewhere. Development should not be permitted for sites within the highly, more, or less vulnerable categories that fall within the functional floodplain.
- Any proportion of the site is shown to be at additional risk from Flood Zone 3b + climate change.

If the LPA can state 'no development in Flood Zone 3b' and the developer can ensure no development in Flood Zone 3b then areas of the site could still be allocated / developed. This should be written into local plan policy.

It is important to state that it may still be possible to deliver a site that has been recommended for withdrawal from allocation upon more detailed investigation through a Level 2 SFRA and subsequent update of the Flood Zone 3b outline through more detailed modelling, if applicable.

Depending on local circumstances, if it is not possible to remove the developable area from Flood Zone 3b or the future Flood Zone 3b to a lower risk zone then development should not be allocated or permitted.

Strategic Recommendation A applies to 33 of the 64 potential development sites.

Any area within Flood Zone 3b must be left as open green space. For smaller sites, this approach is unlikely to be achievable compared to larger sites where there may be enough

space to limit the impact on development yields through effective flood storage or blue green infrastructure. If this is not possible, the site should be withdrawn.

1.1.2 Strategic Recommendation B - Level 2 SFRA required due to medium or high flood risk. Exception Test may be required.

This strategic recommendation does not take into account local circumstances, only that part of the site area falls within a flood zone.

Strategic Recommendation B applies to any site where the following criteria is true:

- Any part of a site is within fluvial Flood Zone 3a (high risk)
- Any part of a site is within fluvial Flood Zone 2 (medium risk)
- Any part of a site is within the high or medium risk surface water flood zones
- Any site modelled to be at additional risk from climate change.

NOTE: the Exception Test only applies to sites at fluvial flood risk, depending on the vulnerability of the site use (see Table 2 of the FRCC-PPG). Less vulnerable (employment) uses of land do not require the Exception Test but may still require a Level 2 SFRA to show whether they can be safe for the lifetime of development.

Strategic Recommendation B applies to sites where a Level 2 SFRA is required to further inform on the risk and developability. This is in accordance with diagrams 1, 2 and 3 and Table 2 of the FRCC-PPG, where any site at high or medium flood risk now and in the future should be assessed in more detail through a Level 2 SFRA.

Strategic Recommendation B applies to 26 of the 64 potential development sites.

1.1.3 Strategic Recommendation C - allocate and progress to developer-led FRA.

This strategic recommendation does not take into account local circumstances, only that part of the site area falls within a flood zone.

Strategic Recommendation C applies to any site where the following criteria is true:

- Any site within the low risk surface water flood zone
- Any site 100% within Flood Zone 1 and not shown to be at risk from medium or high risk surface water flooding, but is greater than 1 hectare in area
- Any site not shown to be at increased risk from climate change.

Strategic Recommendation C applies to five of the 64 potential development sites.

1.2 Assessment of climate change

1.2.1 Impacts of climate change on peak river flows

The Site Assessment spreadsheet (Appendix C) highlights the additional risk to sites, where applicable, as a result of the impact of climate change on the functional floodplain, and on the 1% AEP fluvial event. A proxy approach to assessing climate change was taken as part of this Level 1 SFRA. A summary of this approach is outlined in the functional floodplain delineation technical note in Appendix B and in the main SFRA report.

The Site Assessment spreadsheet highlights the **additional** risk from climate change. This has been assessed using GIS software by clipping the present day functional floodplain extent from the proxy climate change enhanced functional floodplain extent, leaving an outline of the additional area at risk from flooding. Flood Zone 2 has also been used as a proxy to assess the additional impact of climate change on Flood Zone 3a, in the absence of up to date modelling. These extents were then screened against the JLP sites to identify additional risk from climate change.

1.2.2 Impacts of climate change on surface water

The impact of climate change on surface water flood risk should be considered using a proxy approach, assuming that the larger RoFSW return periods provide an indicative outline of the smaller return periods plus climate change. For example, the 100-year RoFSW should be considered as the 30-year plus climate change extent.

1.3 Summary of site assessment outcomes

There are several consequential development considerations which could come out of the site assessment sequential testing process. Each outcome is discussed below. The LPA should refer to Section 1.1 and Appendix C for details on the site assessments carried out for this SFRA.

1.3.1 Rejection of site

A site which fails to pass the Sequential Test and/or the Exception Test should be rejected and development not permitted. Rejection would also apply to any sites within the functional floodplain (unless water compatible or essential infrastructure informed by a FRA). However, if the developer can avoid or incorporate the functional floodplain into site design as open greenspace, part of the site could still be delivered.

In terms of surface water flood risk, if risk is high or medium and considered significant, or where the size of the site does not allow for onsite storage or application or appropriate SuDS, then such sites could be rejected. The LLFA will be best placed to advise on site-specific surface water flood risk and whether sites can be taken forward or whether further work is required.

If following a Level 2 SFRA site assessment, it is found that development is likely to increase flood risk elsewhere, without sufficient space for compensation, if safe access and

escape routes cannot be achieved or if groundwater flood risk is unacceptably high etc. sites may be rejected.

1.3.2 Exception Test required

Applies to those sites that, according to diagrams 1, 2 and 3, and Table 2 of the FRCC-PPG, would require the Exception Test. Only less vulnerable land uses would not require the Exception Test in Flood Zone 3a. More vulnerable uses are only permitted if the Exception Test is passed. A Level 2 SFRA should inform the application of the Exception Test.

1.3.3 Consideration of site layout and design

Site layout and site design is important to consider early on in the site planning stage where flood risk exists. The site area would have to be large enough to enable any alteration of the developable area of the site to remove development from a risk area, or to leave space for onsite storage of floodwater. Careful layout and design at the site planning stage may apply to such sites where it is considered viable based on the level of risk. Surface water risk and opportunities for SuDS should also be assessed during the planning stage.

Any development within 8 metres of any flood defence structure or culvert on a Main River is likely to be a regulated flood risk activity under Schedule 25 of the Environment Permitting (England and Wales) Regulations 2016. Any site redesign, where Flood Zone 3a is included within the site footprint, should allow water to flow naturally or be stored in times of flood. Similarly, any change or alteration to an ordinary watercourse within a site would need consent from the LLFA under the Land Drainage Act 1991[3].

1.3.4 Site-specific Flood Risk Assessment

A site-specific Flood Risk Assessment should assess whether a potential development is likely to be affected by current or future flooding, accounting for the impacts of climate change, from any source. This should include referencing this SFRA to establish sources of flooding. Further analysis should be performed to improve the understanding of flood risk including agreement with the LPA and the EA on areas of functional floodplain that may not have been robustly defined within this SFRA sue to the absence of appropriate EA modelling information. The LLFA can advise on risk from surface water and from ordinary watercourses.

According to the FRCC-PPG (Para 020), a site-specific FRA is:

"…carried out by (or on behalf of) a developer to assess the flood risk to and from a development site and should accompany a planning application where prescribed in footnote 55 of the National Planning Policy Framework. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the

3 Land Drainage Act | GOV.UK | 1991

development's lifetime, taking climate change into account, and with regard to the vulnerability of its users (see NPPF Annex 3 – Flood Risk Vulnerability)".

Possible mitigation measures for at risk sites include ensuring floor levels are raised a minimum of 600 mm above the critical design event flood level (as advised by the EA). However, compensatory storage must be found. If this cannot be achieved, it is for the applicant to identify alternative mitigation measures.

Stilted development is an option whereby floodwaters can flow more naturally without obstacles though this can prove to be a costly solution. Any site identified to be at residual risk must have suitable site access and escape routes available during times of flood together with a full emergency plan that should accompany the FRA at the application stage. The provisions of suitable flood warning systems should also be investigated.

For further detail regarding the requirements of a site specific FRA, refer to the main SFRA report.

When is a site-specific FRA required?

According to the NPPF footnote 59, a site-specific FRA should be prepared when the application is:

- Situated in Flood Zone 2 and 3; for all proposals for new development (including minor development and change of use);
- 1 hectare or greater in size and located in Flood Zone 1;
- Located in Flood Zone 1 on land which has been identified by the EA as having critical drainage problems;
- Land identified in the SFRA as being at increased flood risk in future;
- At risk of flooding from other sources of flooding, such as those identified in this SFRA; or
- Subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding.

The LPA should also consider further options for stipulating FRA requirements, such as:

- At residual risk from flood defence breach, reservoir or canal failure; or
- Situated over a culverted watercourse or where development will require controlling the flow of any watercourse, drain or ditch or the development could potentially change structures known to influence flood flow.

Detailed mitigation must be agreed through site-specific FRAs or through Level 2 SFRAs where it would be necessary to demonstrate site allocations would be safe for their lifetime.

Paragraph 021 of the FRCC-PPG contains information regarding the level of detail required in the FRAs and indicates that it should always be proportionate to the degree of flood risk whilst making use of existing information, including this SFRA. Paragraph 080 of the FRCC-PPG contains an easy to follow FRA checklist for developers to follow.

Together with the information in the FRCC-PPG, there is further detail and support provided for the LPAs and developers via:

Advice for developers

Advice for LPAs

The Environment Agency have also produced guidance for Flood Risk Assessments for planning applications[4].

1.3.5 Sites passing the Sequential and Exception Tests

Development sites can be allocated or granted planning permission where the Sequential Test and the Exception Test (if required) are passed and agreement is reached between the LPA/LLFA, the EA, the water companies and any ancillary stakeholders. In addition, a site is likely to be allocated without the need to assess flood risk where the indicative use is for open space. Assuming the site is not to include any development or land raising / regrading works and is to be left open in its original state then the allocation is likely to be acceptable from a flood risk point of view. However, for sites where there is potential for flood storage, options should be explored as part of a FRA.

In terms of opportunities for reducing flood risk overall as a requirement of the Exception Test, the FRCC-PPG states:

"Developers should refer to the Strategic Flood Risk Assessments and site-specific Flood Risk Assessments to identify opportunities to reduce flood risk overall and to demonstrate that the measures go beyond just managing the flood risk resulting from the development. Reductions could be achieved, for example by:

- *Incorporating green infrastructure within the layout and form of development to make additional space for the flow and storage of flood water;*
- *Providing Sustainable Drainage Systems, that manage flood risk beyond the proposed site and above the usual standard, such as by removing surface water from existing combined sewers;*
- *Providing or making contributions to flood risk management infrastructure that will provide additional benefits to existing communities and/or by safeguarding the land that would be needed to deliver it." (Paragraph 37).*

1.3.6 Surface water flood risk to assessed sites

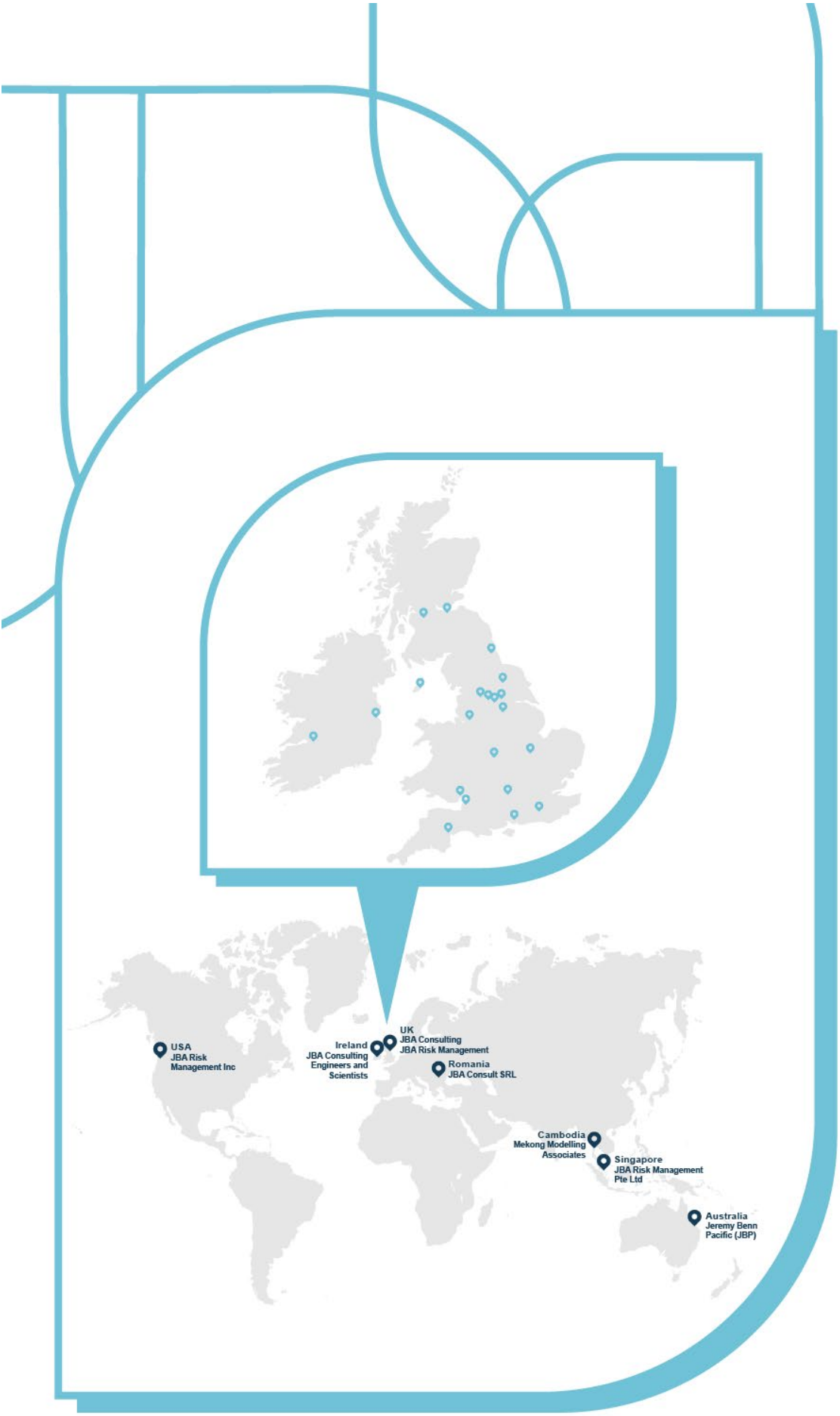
For sites at surface water flood risk, the following should be considered:

- More detailed surface water modelling may reveal increased risk or less risk to a site. The LLFA should be consulted when considering development viability at such sites;
- Outline drainage strategy to ascertain natural flow paths and topographic depressions, particularly for the larger sites which may influence sites elsewhere;

4 Flood risk assessments for planning applications | GOV.UK | February 2017

- A detailed site-specific FRA incorporating surface water flood risk management;
- Full drainage strategy encompassing detailed surface water modelling of proposed site layouts, attenuation areas, diversion of flow routes;
- Ensuring future maintenance of surface water and SuDS assets through s106 agreements;
- The size of development and the possibility of increased surface water flood risk caused by development on current greenfield land (where applicable) and cumulative impacts of this within specific areas;
- Management and re-use of surface water onsite, assuming the site is large enough to facilitate this and achieve effective mitigation. Effective surface water management should ensure risks on and off site are controlled;
- Larger sites could leave surface water flood-prone areas as open greenspace, incorporating social, amenity, and environmental benefits;
- SuDS must be used where possible for all residential developments of ten or more properties, in accordance with the NPPF. Appropriate SuDS may offer opportunities to control runoff to greenfield rates or better. Restrictions on surface water runoff from new development should be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of greenfield rates, unless it can be demonstrated that this is unachievable or hydraulically impractical. Developers should refer to the LLFA's local standards on drainage and the national 'non-statutory technical standards for sustainable drainage systems', and other guidance documents cited in the main report. Note that sites considered for surface water SuDS should not be in locations of fluvial flood risk unless they are designed to mitigate both sources of risk;
- Runoff up to and including the 1% AEP event should be managed on-site where possible, including for climate change impacts;
- Measures of source control should be required for development sites;
- Developers may be required to set part of their site aside for wider management of surface water to contribute to flood risk management in the local area and supplement green infrastructure networks;
- Developers should be required to maximise the use of permeable surfaces;
- Existing flow routes on new development sites should be retained and unobstructed and natural topographical depressions should be left open and not infilled; and
- It may then be beneficial to carry out a local SWMP or large scale drainage strategy for targeted locations with any known critical drainage problems. Investigation into the capacity of existing sewer systems would be required in order to identify critical parts of the system i.e. pinch points. Drainage model outputs could be obtained from the water company to confirm the critical parts of the drainage network and subsequent recommendations could then be made for future development i.e. strategic SuDS implementation, new connections to the existing drainage system should be avoided, any parts of the system that may

have additional capacity should be flagged, recommended runoff rates should apply.



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South Oxfordshire and Vale of White Horse Level 1 SFRA - Appendix E

Catchment-level assessment of Cumulative Impacts of Development on Flood Risk

Final Report

September 2024

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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1 Introduction

Cumulative impacts are defined as the effects of past, current and future activities on the environment. The below assessment is a catchment-based approach, which indicates potential cumulative impacts on the South Oxfordshire and Vale of White Horse study area. These cumulative impacts may be negative, such as development leading to an increase in the existing level of flood risk within a catchment. They may also be positive, such as effective surface water management within a development site helping to alleviate existing flooding issues within a catchment.

The cumulative impact of development should be considered at both the Local Plan making stage and the planning application and development design stages. Paragraph 166 of the National Planning Policy Framework (NPPF, 2023) states:

'Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.'

To understand the impact of future development on flood risk in South Oxfordshire and Vale of White Horse, modelled and historic flood risk data has been compared with potential changes in developed area within each river catchment defined within the Water Framework Directive (WFD). This identifies the catchments where development may have the greatest impact on flood risk, and therefore where further assessment would be required within a site-specific Flood Risk Assessment (FRA).

Where catchments have been identified as sensitive to the cumulative impact of development, the assessment concludes with potential strategic planning policy suggestions to manage the risk.

2 Method

2.1 Cumulative impact assessment

2.1.1 Cumulative impact of development: assessing existing and future development scenarios

To ensure that the strategic policies of the Joint Local Plan consider the impact of any future development on areas susceptible to flooding, the potential development pressures during the Local Plan period need to be considered.

The impact of development is assessed by establishing a growth scenario of development already committed prior to the Joint Local Plan, as well as the potential future development pressures during the Local Plan period.

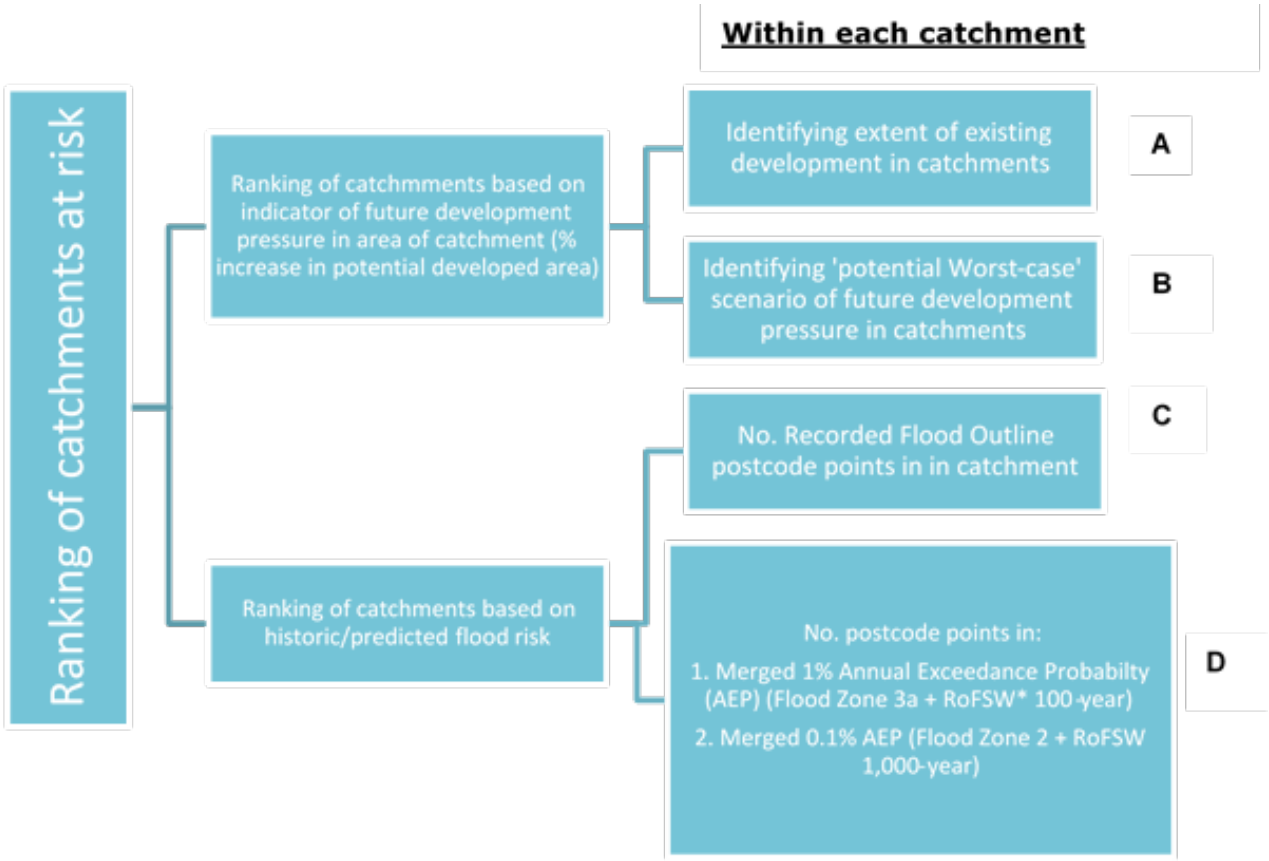
It should be noted that the inclusion of potential future development pressures makes the scoring method sensitive to future change, should any larger sites be removed, or additional sites come forward. However, it provides the best possible indication of development pressure across South Oxfordshire and Vale of White Horse at the time of assessment.

The assessment is undertaken on a river catchment scale, using catchments defined by the Water Framework Directive (WFD). Several of the WFD catchments assessed within the cumulative impact assessment cross administrative boundaries into neighbouring authority areas. To account for this in the study, all neighbouring councils were contacted to provide information of future development within their administrative area. The councils are:

- Oxford City Council
- Cherwell District Council
- Buckinghamshire Council
- Wokingham Borough Council
- Reading Borough Council
- West Berkshire Council
- Wiltshire Council
- Swindon Borough Council
- Cotswold District Council
- West Oxfordshire District Council

The site data received from these councils was combined with that of South Oxfordshire and Vale of White Horse to understand the risk to each WFD catchment, based upon potential future growth.

The approach to understanding the catchments most influenced by the cumulative impact of development is conceptualised in Figure 2-1.



**Risk of Flooding from Surface Water (RoFSW)*

Figure 2-1: Overview of the method used in the Cumulative Impacts Assessment

A. Existing development scenario

To understand the level of existing development within the study area, the Code Point postcode density points covering the South Oxfordshire and Vale of White Horse area were used. This data set contains points plotted at the average co-ordinates representative of all individual addresses within a particular postcode. This also covered the neighbouring authority areas.

B. Indicator of Development pressure

To understand which catchments within the study area are likely to experience the greatest pressure for future growth, all commitments, Joint Local Plan sites and neighbourhood plan sites within South Oxfordshire and Vale of White Horse and the neighbouring authorities were analysed.

This analysis has been used as an indicator of areas likely to be subject to the greatest development pressure in future. This is the only spatial data indicator available at the time of preparing the assessment because definitive development areas have not yet been allocated within all Local Plans within the study area.

The data allows calculation of the overall area of commitments, Joint Local Plan sites and neighbourhood plan sites within each catchment, illustrating the relative pressures on the catchments. This data is used to identify catchments likely to be under the greatest

pressure for development. The percentage total proposed area of development is calculated and ranked with the catchment with the highest proportion of growth ranked as '1'.

Wiltshire provided 33 site allocations that could potentially impact South Oxfordshire and Vale of White Horse; however, these sites were not located within a WFD catchment covering South Oxfordshire and Vale of White Horse. Therefore these sites were not included in the analysis.

Future development data was not received from Buckinghamshire Council, Wokingham Borough Council, Reading Borough Council, Swindon Borough Council, Cotswold District Council or West Oxfordshire District Council. Therefore, the WFD catchments extending from South Oxfordshire and Vale of White Horse authority area have not considered future development from neighbouring authorities within the assessment.

Table 2-1: Summary of datasets used to define river catchments

Dataset	Coverage	Source of data	Use of data
Catchment boundaries	South Oxfordshire and Vale of White Horse area	Water Framework Directive (WFD) catchments	Existing development / flood risk

Table 2-2: Summary of datasets used to estimate future development pressure

Dataset	Coverage	Source of data	Use of data
Sites received for consideration	South Oxfordshire and Vale of White Horse area	South Oxfordshire District Council, Vale of White Horse District Council	Indicator of relative development pressure
Neighbouring authority Local Plan allocations and committed developments	Catchments covering the South Oxfordshire and Vale of White Horse study area	West Berkshire Council, Oxford City Council, Cherwell District Council, Wiltshire Council	Indicator of relative development pressure

Table 2-3: Summary of datasets used to rank catchments by flood risk

Dataset	Coverage	Source of data	Use of data
Merged 1 in 100-year flood extent (Flood Zone 3a and 1 in 100-year RoFSW extent)	Catchments covering the South Oxfordshire and Vale of White Horse study area	Environment Agency (EA)	Potential fluvial and surface water flood risk
Merged 1 in 1000-year flood extent (Flood Zone 2 and 1 in 1000-year RoFSW extent)	Catchments covering the South Oxfordshire and Vale of White Horse study area	Environment Agency (EA)	Potential future fluvial and surface water flood risk

Dataset	Coverage	Source of data	Use of data
Recorded Flood Outline	Catchments covering the South Oxfordshire and Vale of White Horse study area	Environment Agency (EA)	Historic fluvial flooding
OS Code Point Open postcode points - plotted at the average coordinates representative of all individual addresses within a particular postcode	Catchments covering the South Oxfordshire and Vale of White Horse study area	Ordnance Survey (Open source)	Proxy for number of properties at risk

2.1.2 Cumulative impact of flood risk: assessment of flood risk

A composite flood risk score is derived for each catchment, by taking an average ranking of both recorded fluvial risk (historic incidents) and modelled (predicted) fluvial and surface water flood risk.

To understand the relative flood risk within the catchments, a ranking system is adopted, with the worst-case flood risk numbered '1'.

2.1.2.1 Historic flood risk

Data used in assessment:

- EA Recorded Flood Outline (number of property postcode points affected) - flood extents mapped following flood events (largely relates to fluvial flooding). This is intersected with postcode points, to approximate the number of properties affected.

2.1.2.2 Sensitivity to increases in flood flows

Data used in assessment:

- Present day risk: Merged fluvial and surface water 1 in 100-year (1% AEP) flood extent - Flood Zone 3a and RoFSW 100-year (number of postcode points at risk within catchment).
- Future risk: Merged fluvial and surface water 1 in 1,000-year (0.1% AEP) flood extent - Flood Zone 2 and RoFSW 1000-year (number of postcode points at risk within catchment).
- Postcode point data is used to identify properties within the South Oxfordshire and Vale of White Horse study area.
- The postcode data is separately intersected with the Present day (1 in 1,000-year) and Future (1 in 100-year) risk merged fluvial and surface water flood

extents, to approximate the increase in the number of properties at risk of flooding. The flood extents are merged to prevent double counting of properties at risk where fluvial and surface water flood risks overlap.

- The difference between the Present and Future risk is then calculated and given as a percentage of the total number of OS Code Point Open points in the catchment. This gives an indication of which catchments are most sensitive to increases in surface water runoff from upstream. For example, if there were 100 postcode points in a catchment, 15 within the 1 in 1,000-year merged flood extent and 5 within the 1 in 100-year merged flood extent, 10% of properties in that catchment are considered sensitive to increased flood risk.
- The assessment is an indicator of where local topography makes an area more sensitive to increases in flood risk. This may be due to any number of reasons, including climate change, new development etc. It is not an absolute figure or prediction of the impact that new development will have on flood risk.
- It should be noted that the Flood Zones represent flood risk from watercourses designated by the Environment Agency as Main Rivers, with a catchment area greater than 3km^2. There is no national dataset of flood risk mapping from smaller, ordinary watercourses. However, as the RoFSW mapping identifies the lowest points in the topography which includes the river floodplains, it can be used as a proxy to represent fluvial flood risk from ordinary watercourses. This approach has been used within the cumulative impacts assessment.

2.1.3 Assessment assumptions and limitations

Table 2-4 sets out the assumptions and limitations of the cumulative impacts assessment.

Table 2-4: Assumptions and limitations of the assessment

Assessment aspect	Assumption made	Details of limitation in method	Justification
Development pressure	Assumption of housing density and impermeable areas	Where potential development densities were not known for the sites, it is assumed that 70% of the site area would contribute surface water runoff to the wider catchment. This takes into account a 30% allowance for landscaping and requirements for SuDS within sites, which lessens the impacts of new	With housing densities and proportions of undeveloped areas not known, the approach aims to provide a more realistic indication of site development in the growth scenario.

Assessment aspect	Assumption made	Details of limitation in method	Justification
		development.	
Development pressure	Potential development site area not provided for all neighbouring authorities	Potential development sites were not made available to feed into the assessment for Buckinghamshire, Wokingham, Reading, Swindon, Cotswold and West Oxfordshire. Wiltshire provided 33 sites with the potential to impact South Oxfordshire and Vale of White Horse however this did not fall within a WFD catchment shared with the study area.	Potential development pressure was not taken into account for the WFD catchments shared between South Oxfordshire and Vale of White Horse and the aforementioned neighbouring authorities. Cumulative impacts were assessed through flood risk only.
Development pressure	Current site use assumed to be greenfield (undeveloped)	The current use of the sites (e.g. greenfield/brownfield) is often undefined. Brownfield sites are likely to have a less significant impact on flood risk as they have previously been developed. Therefore, in absence of this information, a 'worst case' assessment is produced, which assumes that all sites are greenfield (undeveloped) and may overestimate the risk within each catchment.	The assessment considers the 'worst case' development scenario, that all sites were greenfield (undeveloped) prior to growth. With the former land uses for each site not known, the approach overestimates the potential impact, but this is a precautionary approach.

Assessment aspect	Assumption made	Details of limitation in method	Justification
Flood risk	Overlap between fluvial and surface water flood extents	The Risk of Flooding from Surface Water mapping identifies the lowest points in the landscape, and therefore low-lying river floodplains are also classified as being at surface water risk. This can lead to 'double counting' of flood risk.	To prevent double counting, the Flood Zone and Risk of Flooding from Surface Water datasets are merged, to create a composite flood risk layer, with any overlapping areas dissolved.
Flood risk	Use of OS Code Point Open postcode point data to represent properties affected by historic/predicted flood risk	As postcode points represent the average location of all properties within a postcode area, there may be properties at the edges of a catchment or the study area which are counted within the neighbouring area, or not picked up at all. The dataset is based on full postcodes.	The postcode points are an available open source dataset. Postcode area sizes are also relative to the density of properties in a location, providing better data coverage in areas where a greater number of properties were likely to be affected.

2.1.4 Ranking the results

The results are ranked for each of the above assessments from 1 to 42. For example, the catchment with the highest percentage of code points within the recorded flood outline dataset would be ranked at number 1. The individual flood risk, historic flooding and development ranks are added to give an overall ranking for each catchment, as indicated in Table 2-5. The catchment with the lowest combined rank is the most sensitive to the cumulative impact of development.

Table 2-5: Breakdown in rankings for each assessment

Catchment Name	Growth rank	Historic Flood Risk rank	Predicted Flood Risk rank	Total Combined rank	Overall rank
Ock and tributaries (Land Brook confluence to Thames)	7	5	3	15	1
Thames (Evenlode to Thame)	4	8	6	18	2
Ginge Brook and Mill Brook	9	4	7	20	3
Thames Wallingford to Caversham	26	7	2	35	4
Thames (Leach to Evenlode)	34	3	1	38	5
Moor Ditch and Ladygrove Ditch	3	28	9	40	6
Oxon Ray (upstream A41 to Cherwell) including Otmoor	10	23	10	43	7
Northfield Brook (Source to Thames) at Sandford	1	30	13	44	8
Thames (Reading to Cookham)	30	11	4	45	9
Radcot Cut	37	6	5	48	10
Sandford Brook (source to Ock)	15	19	17	51	11
Letcombe Brook	12	17	23	52	12
Chalgrove Brook	13	22	18	53	13
Cherwell (Ray to Thames) and Woodeaton Brook	2	20	32	54	14
Bayswater Brook	5	26	24	55	15
Childrey Brook and Norbrook at Common Barn	17	1	37	55	15
Berrick Stream and Lady Brook	11	30	16	57	16

Catchment Name	Growth rank	Historic Flood Risk rank	Predicted Flood Risk rank	Total Combined rank	Overall rank
Cole (Bower Bridge to Thames) including Coleshill	37	10	11	58	17
Thame (Scotsgrove Brook to Thames)	16	21	22	59	18
Pang	32	16	14	62	19
Sulham Brook	25	2	37	64	20
Coln (from Coln Rogers) and Thames (Coln to Leach)	37	9	19	65	21
Ock (to Cherbury Brook)	24	15	28	67	22
Cuttle Brook	19	30	21	70	23
Frilford and Marcham Brook	23	12	35	70	23
Cholsey Brook and tributaries	28	13	31	72	24
Childrey and Woodhill Brooks	6	30	37	73	25
Mill Brook and Bradfords Brook system, Wallingford	14	29	30	73	25
Tuckmill Brook and tributaries	22	25	27	74	26
Haseley Brook	8	30	37	75	27
Wye (Source to High Wycombe fire station)	37	30	8	75	27
Filchhampstead Brook at Farmoor	37	30	12	79	28
Hamble Brook	37	14	29	80	29
Lambourn (Source to Newbury)	33	27	20	80	29
Kingsey Cuttle Brook and tributaries at	36	30	15	81	30

Catchment Name	Growth rank	Historic Flood Risk rank	Predicted Flood Risk rank	Total Combined rank	Overall rank
Thame					
Chinor Brook and Sydenham Brook	29	30	25	84	31
Waterloo Ditch (East of Coleshill)	18	30	37	85	32
Holton Brook and tributaries	31	18	37	86	33
Baldon Brook (South of Oxford)	20	30	37	87	34
Cow Common Brook and Portobello Ditch	21	30	37	88	35
Wadley Stream (Source to Thames at Duxford)	37	30	26	93	36
Stutfield Brook (Source to Ock)	27	30	37	94	37
Thame (Aylesbury to Scotsgrove Brook)	37	24	37	98	38
Ewelme Stream (Source to Thames)	37	30	33	100	39
Cole (Acorn Bridge to Bower Bridge)	35	30	37	102	40
Winterbourne	38	30	34	102	40
Scotsgrove Brook (upstream Kingsey Cuttle Brook)	37	30	36	103	41
Latchford Brook at Tetsworth	37	30	37	104	42
Lenta Brook, East of Swindon	37	30	37	104	42
Lewknor Brook	37	30	37	104	42
Worminghall Brook and tributaries	37	30	37	104	42

A Red Amber Green (RAG) rating is then applied to the catchments, with red being high sensitivity, amber being medium sensitivity, and green being low sensitivity. It should be noted that this assessment provides a relative assessment of sensitivity to increases in flood risk and development between catchments within the study area.

Specific policies are provided for each resulting risk category. Catchment-specific planning policy considerations are identified for the catchments where cumulative development is likely to have the greatest impact on flood risk to communities. The overall analysis provides context for further appropriate consideration of catchment-scale flood risk issues.

In addition to assessment at a Strategic Flood Risk Assessment (SFRA) level, it is recommended that site-specific Flood Risk Assessments (FRAs) are required to include consideration of the cumulative effects of the proposed development. It should be demonstrated that flood risk downstream will not be made worse by the combination of effects from more than one development allocation.

A map of the RAG rating for each catchment is shown in Figure 2-2 and a summary of the final results is shown in Table 2-6, Table 2-7 and Table 2-8. Specific policies are provided for each resulting risk category.

The catchments rated as at high sensitivity to the cumulative impacts of development are:

- Ginge Brook and Mill Brook
- Moor Ditch and Ladygrove Ditch
- Northfield Brook (Source to Thames) at Sandford
- Ock and tributaries (Land Brook confluence to Thames)
- Oxon Ray (upstream A41 to Cherwell including Otmoor
- Thames (Evenlode to Thame)
- Thames (Leach to Evenlode)
- Thames (Reading to Cookham)
- Thames (Wallingford to Caversham)

The catchments rated as medium sensitivity to the cumulative impacts of development are:

- Bayswater Brook
- Berrick Stream and Lady Brook
- Chalgrove Brook
- Cherwell (Ray to Thames) and Woodeaton Brook
- Childrey Brook and Norbrook at Common Barn
- Cole (Bower Bridge to Thames) including Coleshill
- Letcombe Brook
- Pang
- Radcot Cut
- Sandford Brook (source to Ock)
- Thame (Scotsgrove Brook to Thames)

The catchments rated as low sensitivity to the cumulative impacts of development are:

- Baldon Brook (South of Oxford)
- Childrey and Woodhill Brooks
- Chinor Brook and Sydenham Brook
- Cholsey Brook and tributaries
- Cole (Acorn Bridge to Bower Bridge)
- Coln (from Coln Rogers) and Thames (Coln to Leach)
- Cow Common Brook and Portobello Ditch
- Cuttle Brook
- Ewelme Stream (Source to Thames)
- Filchampstead Brook at Farmoor
- Frilford and Marcham Brook
- Hamble Brook
- Haseley Brook
- Holton Brook and tributaries
- Kingsey Cuttle Brook and tributaries at Thame
- Lambourn (Source to Newbury)
- Latchford Brook at Tetsworth
- Lenta Brook, East of Swindon
- Lewknor Brook
- Mill Brook and Bradford Brook system, Wallingford
- Ock (to Cherbury Brook)
- Scotsgrove Brook (upstream Kingsey Cuttle Brook)
- Stutfield Brook (Source to Ock)
- Sulham Brook
- Thame (Aylesbury to Scotsgrove Brook)
- Tuckmill Brook and tributaries
- Wadley Stream (Source to Thames at Duxford)
- Waterloo Ditch (East of Coleshill)
- Winterbourne
- Worminghall Brook and tributaries
- Wye (Source to High Wycombe fire station)

No growth or development was proposed in the following catchments. These catchments have been included in the cumulative impact assessment. However, they only represent sensitivity to flood risk and not growth:

- Cole (Bower Bridge to Thames) including Coleshill
- Coln (from Coln Rogers) and Thames (Coln to Leach)
- Ewelme Stream (Source to Thames)
- Hamble Brook
- Latchford Brook at Tetsworth
- Lenta Brook, East of Swindon

- Lewknor Brook
- Radcot Cut
- Scotsgrove Brook (upstream Kingsey Cuttle Brook)
- Thame (Aylesbury to Scotsgrove Brook)
- Worminghall Brook and tributaries
- Wye (Source to High Wycombe fire station)

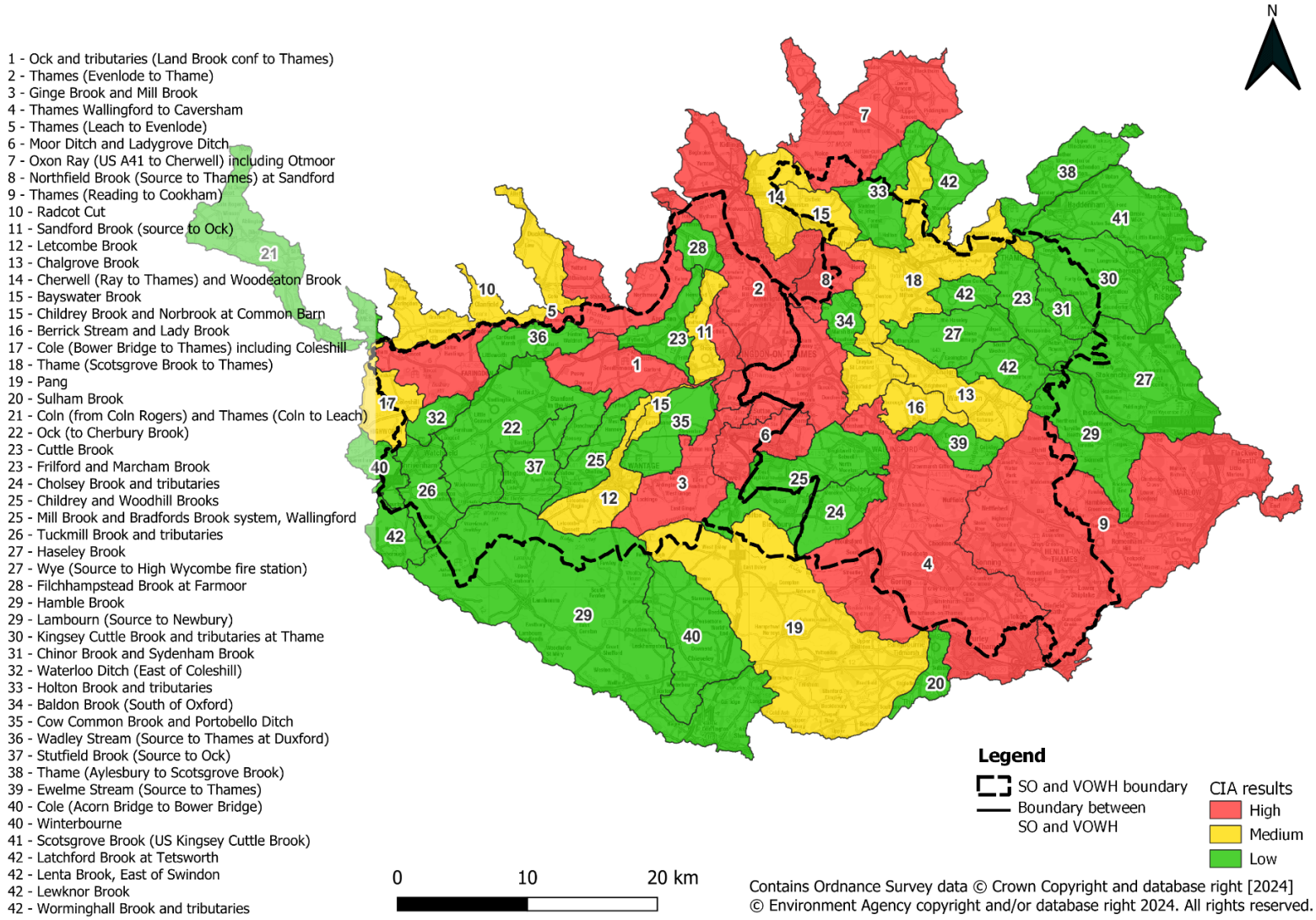


Figure 2-2: Sensitivity of catchments within and around the South Oxfordshire and Vale of White Horse study area to cumulative impacts

Table 2-6: Results of cumulative impacts assessment (High Overall Rank)

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
1	Ock and tributaries (Land Brook confluence to Thames)	Remains within study area	Medium	4.66%	41	9.1%	High	High	1
2	Thames (Evenlode to Thame)	Into Vale of White Horse from the north	High	7.46%	226	7.4%	High	High	2
3	Ginge Brook and Mill Brook	Remains within study area	Medium	3.78%	18	7.4%	High	High	3
4	Thames Wallingford to Caversham	Out of South Oxfordshire to the south	Low	0.35%	223	10.2%	High	High	4
5	Thames (Leach to Evenlode)	Into Vale of White Horse from the north	Low	0.07%	29	11.6%	High	High	5
6	Moor Ditch and Ladygrove Ditch	Remains within study area	High	13.72%	1	4.6%	Low	High	6
7	Oxon Ray	Into South	Medium	3.29%	2	4.4%	Medium	High	7

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
	(upstream A41 to Cherwell) including Otmoor	Oxfordshire from the north							
8	Northfield Brook (Source to Thames) at Sandford	Into South Oxfordshire from the north	High	17.93%	0	3.9%	Low	High	8
9	Thames (Reading to Cookham)	Out of South Oxfordshire to the east	Low	0.15%	98	8.9%	High	High	9

Table 2-7: Results of cumulative impacts assessment (Medium Overall Rank)

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
10	Radcot Cut	Into Vale of White Horse from the north	Low	0.00%	9	8.0%	High	Medium	10
11	Sandford Brook (source to Ock)	Remains within study area	Medium	2.27%	1	3.4%	Low	Medium	11
12	Letcombe Brook	Remains within study area	Medium	2.67%	7	2.3%	Low	Medium	12
13	Chalgrove Brook	Remains within study area	Medium	2.48%	2	3.3%	Low	Medium	13
14	Cherwell (Ray to Thames) and Woodeaton Brook	Into South Oxfordshire from the north	High	15.73%	9	1.6%	Low	Medium	14
15	Bayswater Brook	Into South Oxfordshire from the west	Medium	5.69%	1	2.2%	Low	Medium	15

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
15	Childrey Brook and Norbrook at Common Barn	Remains within study area	Medium	1.70%	7	0.0%	Low	Medium	15
16	Berrick Stream and Lady Brook	Remains within study area	Medium	2.95%	0	3.4%	Low	Medium	16
17	Cole (Bower Bridge to Thames) including Coleshill	Into Vale of White Horse from the west	Low	0.00%	3	4.3%	Low	Medium	17
18	Thame (Scotsgrove Brook to Thames)	Into South Oxfordshire from the north	Medium	1.81%	7	2.5%	Low	Medium	18
19	Pang	Out of Vale of White Horse to the south	Low	0.09%	9	3.8%	Medium	Medium	19

Table 2-8: Results of cumulative impacts assessment (Low Overall Rank)

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
20	Sulham Brook	Out of South Oxfordshire to the south	Low	0.49%	11	0.0%	Low	Low	20
21	Coln (from Coln Rogers) and Thames (Coln to Leach)	Into Vale of White Horse from the north west	Low	0.00%	11	2.9%	Medium	Low	21
22	Ock (to Cherbury Brook)	Remains within study area	Low	0.50%	4	2.0%	Low	Low	22
23	Cuttle Brook	Remains within study area	Medium	1.55%	0	2.5%	Low	Low	23
23	Frilford and Marcham Brook	Remains within study area	Low	0.88%	3	1.0%	Low	Low	23
24	Cholsey Brook and tributaries	Remains within study area	Low	0.27%	3	1.6%	Low	Low	24
25	Childrey and Woodhill Brooks	Remains within study area	Medium	5.63%	0	0.0%	Low	Low	25

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
25	Mill Brook and Bradfords Brook system, Wallingford	Into Vale of White Horse from the south	Medium	2.40%	1	1.8%	Low	Low	25
26	Tuckmill Brook and tributaries	Into Vale of White Horse from the south	Low	0.91%	1	2.0%	Low	Low	26
27	Haseley Brook	Remains within study area	Medium	4.37%	0	0.0%	Low	Low	27
27	Wye (Source to High Wycombe fire station)	Out of South Oxfordshire to the south east	Low	0.00%	0	6.6%	Low	Low	27
28	Filchhampstead Brook at Farmoor	Remains within study area	Low	0.04%	0	3.9%	Low	Low	28
29	Hamble Brook	Out of South Oxfordshire to the south east	Low	0.00%	3	1.9%	Low	Low	29
29	Lambourn (Source to Newbury)	Out of Vale of White Horse to the south	Low	0.09%	2	2.8%	Low	Low	29

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
30	Kingsey Cuttle Brook and tributaries at Thame	Into South Oxfordshire from the east	Low	0.05%	0	3.5%	Low	Low	30
31	Chinor Brook and Sydenham Brook	Remains within study area	Low	0.23%	0	2.1%	Low	Low	31
32	Waterloo Ditch (East of Coleshill)	Remains within study area	Medium	1.65%	0	0.0%	Low	Low	32
33	Holton Brook and tributaries	Into South Oxfordshire from the north	Low	0.10%	1	0.0%	Low	Low	33
34	Baldon Brook (South of Oxford)	Remains within study area	Medium	1.42%	0	0.0%	Low	Low	34
35	Cow Common Brook and Portobello Ditch	Remains within study area	Medium	1.06%	0	0.0%	Low	Low	35
36	Wadley Stream (Source to	Remains within study area	Low	0.00%	0	2.1%	Low	Low	36

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
	Thames at Duxford)								
37	Stutfield Brook (source to Ock)	Remains within study area	Low	0.32%	0	0.0%	Low	Low	37
38	Thame (Aylesbury to Scotsgrove Brook)	Into South Oxfordshire from the north east	Low	0.00%	1	0.0%	Low	Low	38
39	Ewelme Stream (Source to Thames)	Remains within study area	Low	0.00%	0	1.4%	Low	Low	39
40	Cole (Acorn Bridge to Bower Bridge)	Into Vale of White Horse from the west	Low	0.06%	0	0.0%	Low	Low	40
40	Winterbourne	Remains within study area	Low	0.02%	0	1.4%	Low	Low	40
41	Scotsgrove Brook (upstream Kingsey Cuttle Brook)	Into South Oxfordshire from the north east	Low	0.00%	0	0.9%	Low	Low	41

Map label	Catchment Name	Drainage direction	Growth RAG score	% area of growth	Postcode points in historic flood outlines	% increase in properties at risk: 1 in 100 to 1 in 1,000-year flood extent	Flood Risk RAG score	Overall RAG score	Overall rank
42	Latchford Brook at Tetsworth	Remains within study area	Low	0.00%	0	0.0%	Low	Low	42
42	Lenta Brook, East of Swindon	Into Vale of White Horse from the south	Low	0.00%	0	0.0%	Low	Low	42
42	Lewknor Brook	Remains within study area	Low	0.00%	0	0.0%	Low	Low	42
42	Worminghall Brook and tributaries	Into South Oxfordshire from the north	Low	0.00%	0	0.0%	Low	Low	42

2.1.5 Planning policy considerations

Catchment-specific planning policy considerations have been identified for the catchments where cumulative development is likely to have the greatest impact on flood risk to communities.

In addition to assessment at a SFRA level, it is recommended that site-specific FRAs are required to include consideration of the cumulative effects of the proposed development. It should be demonstrated that flood risk downstream will not be made worse by the combination of effects from more than one development allocation.

1. Considerations for all developments in South Oxfordshire and Vale of White Horse

- Developments should seek betterment of existing flood risks both within the site and in surrounding areas. As a minimum, developments must meet national and local standards for Flood Risk Assessments and Surface Water Drainage Strategies. By looking at flood risks beyond the site boundary, developers should be encouraged to implement sustainable solutions which manage flood risk.
- New settlement areas should be accompanied by an overall Surface Water Drainage Strategy. This should cover:
    - How the cumulative impacts of potential peak rates and volumes of surface water runoff from development sites would impact on the peak flows, duration of flooding and timing of flood peaks on receiving watercourses. This should be used to develop and implement appropriate drainage sub-catchments for the management of surface water, as well as specific runoff rate and volume requirements for each phase of the development.
    - The risk of flooding from all sources, including for rainfall events greater than the design standard of the surface water drainage system should be taken into account. This is to ensure there is no flood risk to new properties and that exceedance flows in extreme events are safely routed around those properties.
    - The consideration of how SuDS, natural flood management techniques, green infrastructure and green-blue corridors can be designed into the development master plan to facilitate drainage flood risk management. As well as managing the quantity of water, they should also ensure the wider benefits of biodiversity, amenity, water quality and recreation are realised.
    - Based on the above, a drainage phasing plan aligned with the SuDS train method should be developed. Firstly, it should consider how water can be infiltrated / stored at a plot level, then conveyed through the site. It should also identify any regional storage needs at a settlement level.
    - The provision of drainage shall be based on the drainage phasing plan, to ensure adequate drainage is provided implemented throughout the lifetime of the development. This includes provision of adequate drainage during the construction phase, to manage the risk of flooding, erosion and pollution during construction.

- South Oxfordshire District Council and Vale of White Horse District Council (as LPAs); Oxfordshire County Council (as LLFA) and the Environment Agency should be consulted during the development of the Surface Water Drainage Strategy.

- In upland and rural areas of the catchments, Natural Flood Management (NFM) techniques, such as woodland planting and earth bunds, can be used to slow down and store flood waters upstream of settlements.
- In urban and suburban locations, SuDS should be integrated into the site design, to manage the existing surface water flow paths on the site and to help mitigate the flood risks to downstream communities.
- Successive minor developments have the potential to significantly impact on existing surface water and flood risk issues, particularly as the LLFA is not currently consulted on these applications. Therefore, planning policy for minor developments should support existing LPA guidance on the reduction of existing runoff rates, through the use of SuDS.
- Any development within the fluvial floodplain (i.e. Flood Zones 3b, 3a and 2) should provide suitable flood compensation storage, in consultation with the Environment Agency, to avoid a net loss in floodplain storage.
- The LLFA and other Risk Management Authorities (RMAs) should use the information in the SFRA to inform a long-term pipeline of flood alleviation studies and schemes to determine where further developer contributions on / off site would be beneficial.

2. Planning considerations for medium sensitivity catchments

All new developments (other than minor extensions) in these catchments should:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Oxfordshire SuDS Guidance[1]. Preference will be given to above ground, vegetated SuDS, which contribute to the conservation and enhancement of biodiversity and green infrastructure in the study area.
- Developments in these areas should be incentivised to provide wider betterment by being requested to demonstrate in site specific Flood Risk Assessments and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream. This may either be through provision of additional storage on site e.g. through oversized SuDS, natural flood management techniques, green infrastructure and green-blue corridors and/or by providing a Partnership Funding contribution towards a wider community scheme.
- Both greenfield and brownfield developments are to aim to achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

1 Oxfordshire SuDS Guidance

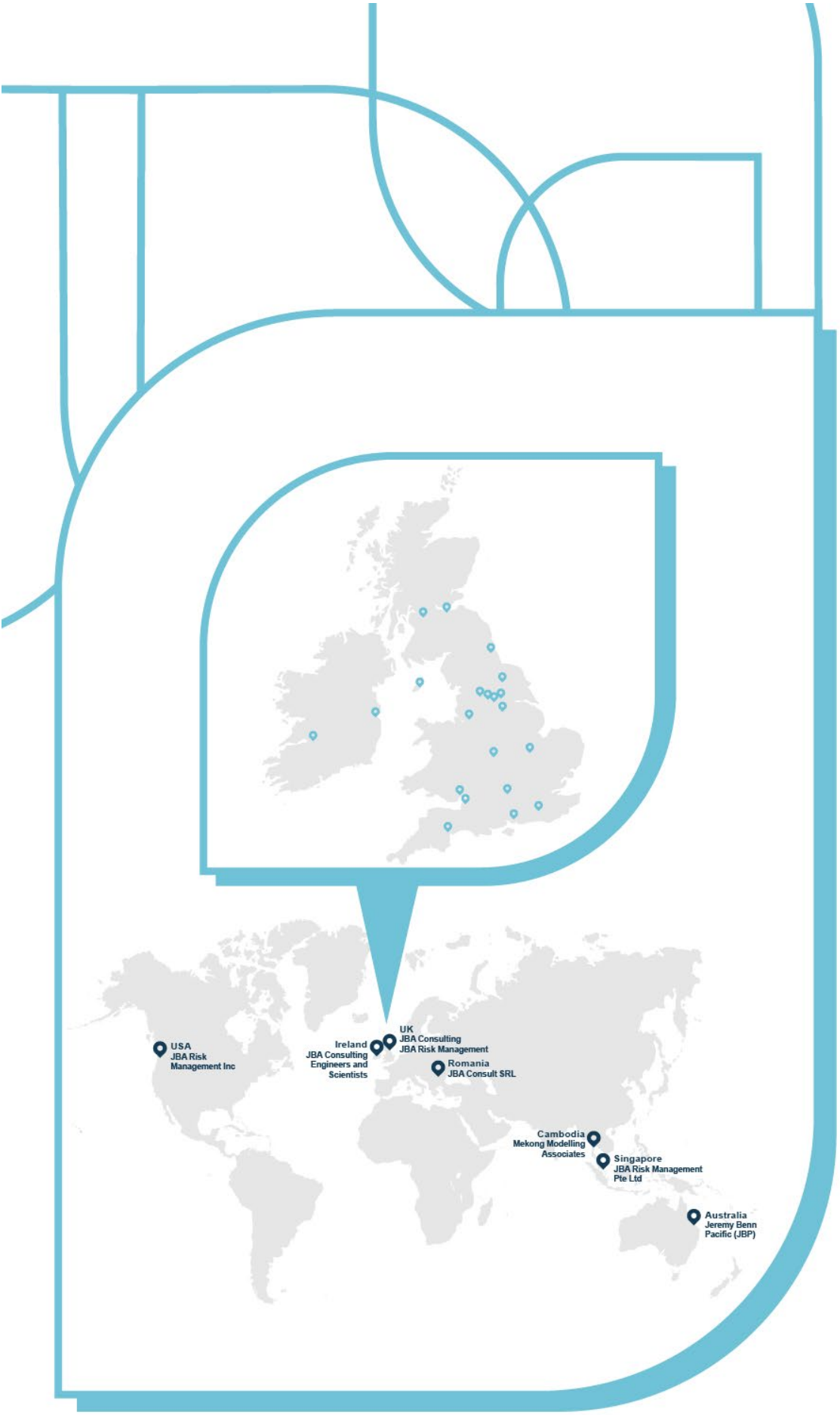
3. Planning considerations for higher sensitivity catchments

All new development (other than minor extensions) in these catchments:

- National and local flood risk planning policy must be stringently applied within these areas, with flood risk from all sources given the appropriate priority, particularly when applying the Sequential and Exception Tests.
- Both greenfield and brownfield developments to achieve 20% betterment over pre-development greenfield runoff peak flows[2] and volumes[3] in their post-development state, to counter cumulative impacts of development within the catchment.
- A Surface Water Drainage Strategy should be required for all developments in these catchments, regardless of development size. This would mean that a site-specific Flood Risk Assessment would be required for all developments, regardless of their size.
- The Environment Agency (EA) may designate higher sensitivity catchments as Areas with Critical Drainage Problems (ACDPs) as required. If an area with critical drainage is identified, the Local Planning Authority (LPA) (supported by the Lead Local Flood Authority (LLFA)) should draft a policy within their Joint Local Plan to manage flood risk from local sources in these catchments with critical drainage problems.
- For larger sites and strategic developments (e.g. new settlements and urban extensions):
    - The LLFA, Environment Agency and LPA should be consulted at pre-application stage.
    - The FRA should examine the cumulative impacts of proposed peak surface water runoff rates and volumes from across the site on the peak flows, duration of flooding and timing of flood peaks in receiving watercourses. This should include the impact of other developments within the WFD catchment, if appropriate, as advised by the LPAs/LLFA.
    - A Surface Water Drainage Masterplan should be developed and implement appropriate drainage sub-catchments for the management of surface water, with specific runoff rate and volume requirements set for each sub-catchment, in line with the SuDS management train.
- Particular attention should be given to limiting runoff volumes to greenfield volume, with long-term storage to be provided where required. The timing of runoff released from the development site will need to be assessed against peak flow timings on the receiving watercourse, to ensure that discharges do not have a detrimental impact on downstream flood risk.
    - The timing of flows released from the development site will need to be assessed in the context of peak flows on the receiving watercourse.

2 For the 1 in 1 year rainfall event and the 1 in 100 year rainfall event
3 For the 1 in 100 year, 6 hour rainfall event

  - Every opportunity should be taken to infiltrate and/or store water at a plot level.
  - Longer-term measures for managing flood risk should be considered, including river restoration and contributions to pipeline flood alleviation schemes.
- Where development sites receive runoff from, or drain towards, neighbouring authorities, the LPAs should work closely with neighbouring LPAs and the LLFA to develop complementary Local Planning Policies on cumulative flood risk and sustainable drainage.



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